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THE

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES.

FOR THE YEAR

1898.

Vol. XXIII.

WITH THIRTY-THREE PLATES.

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CORRIGENDA.

Page 160, line 15—for *Fragm.*, i. i. read *Fragm.*, i. 1.
Page 366, line 22—for *costatis* read *costatus*.
Page 371, line 21—for *E. meliodora* read *E. melliodora*.

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES.

WEDNESDAY, 30TH MARCH, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, March 30th, 1898.

Professor J. T. Wilson, M.B., Ch.M., President, in the Chair.

DONATIONS.

(Received since the Meeting in November, 1897.)

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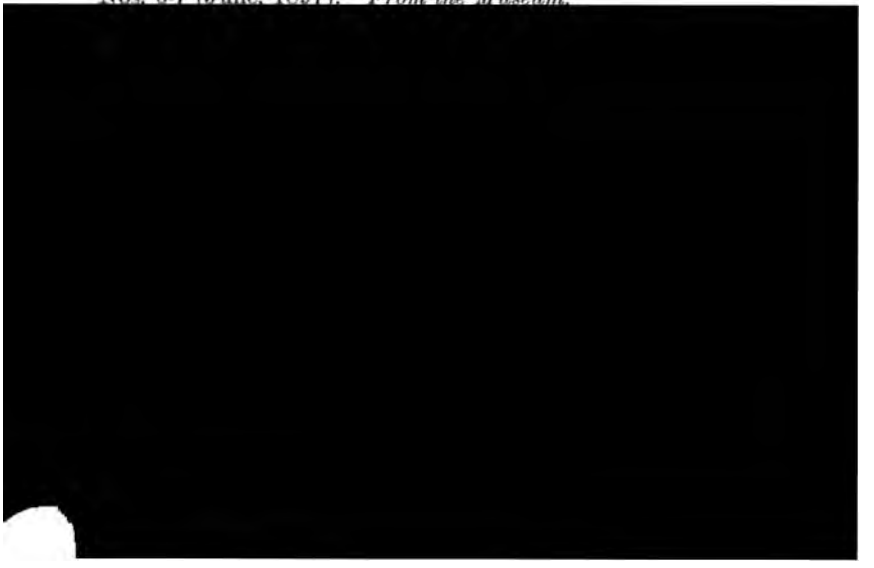

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La Nuova Notarisia. Serie viii. Novembre, 1898; Serie ix. Gennaio, 1898: Sylloge Algarum. Vol. iv. *Florideæ.* Sec. i. (1897). *From Dr. G. B. De Toni.*

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Meteorological Commission, Cape of Good Hope—A Discussion of the Rainfall of S. Africa during the Ten Years 1885-94. By A. Buchan, M.A., LL.D., F.R.S.E. *From the Commission.*

NOTES FROM THE BOTANIC GARDENS, SYDNEY.

No. 2.

By J. H. Maiden and E. Betche.

LEGUMINOSÆ.

Oxylobium ellipticum, *R.Br.*, var. alpinum, var. nov.

A compact shrub rarely exceeding 2 feet in height as far as seen at present. Leaves elliptical, about 4 lines long. Inflorescence terminal, forming dense compact heads in the specimens from high altitudes. In such situations it forms dense carpet-like masses clinging to and following the shapes of loose masses of rock.

Mt. Kosciusko, from Jindabyne to the summit (J. H. Maiden, January, 1898); Bullrock Mt., Snowy Mts. (W. Baeuerlen, March, 1893); Kiandra District (E. Betche, February, 1897); Bombala (J. H. Maiden, December, 1896); Cooma District (W. Baeuerlen, October, 1893); Blackheath (E. Betche, December, 1885).

Acacia Maideni, *F.v.M.*—Como, near Sydney (J. H. Camfield, November, 1897).

Previously recorded only from the Northern Coast District, now found to extend southward to beyond Port Jackson.

Acacia Muelleriana, *Maiden and Baker.*—Dubbo (J. L. Boorman, December, 1897).

Previously recorded only from Taloobie, Rylstone District. The new locality brings it over a hundred miles further to the westward.

Acacia pumila, *Maiden and Baker.*—Described three years ago from specimens collected at Kenthurst, near Parramatta; it has since been received from Mt. Tomah, Lawson (Blue Mountains); Kogarah (Botany Bay); and Middle Harbour (Port Jackson).

ACACIA VOMERIFORMIS, *A. Cunn.*—Specimens from Sawpit Creek, Mt. Kosciusko, do not show the seeds mottled as figured in Hooker, *Fl. Tas.* (i. t. 18), nor is the mottling present in a Tasmanian specimen we have examined.

MYRTACEÆ.

LEPTOSPERMUM LANIGERUM, *Sm.*, var. MACROCARPUM, var. nov.

An almost prostrate form of this exceedingly variable species, with broad leaves and large flowers and capsules; the largest capsules seen attain 7 to 8 lines in diameter.

Mt. Tomah (J. Gregson, November and December, 1897).

BÆCKEA VIRGATA, *Andr.*, var. POLYANDRA, var. nov.—Distinguished from the normal species chiefly by the numerous stamens (about 25 to above 30) in a continuous series as in *Leptospermum*, and by the flowers always occurring singly in the axils and not umbellate. Forms dense bushes 6-8 ft. high on the banks of the Snowy River at Jindabyne (J. H. Maiden, January, 1898).

We would rather take this plant for a new species than for a variety of *B. virgata*, but for a Victorian specimen in the herbarium, which forms a connecting link between the typical *B. virgata* and the Mt. Kosciusko form. The Victorian specimen has also single flowers, and resembles in habit the Snowy River

STYLIDEÆ.

STYLIDIUM EGLANDULOSUM, *F.v.M.*—Dubbo (J. L. Boorman, December, 1897).

The most southern locality previously recorded is the Warrumbungle Ranges, Namoi River, N.S.W.

EPACRIDEÆ.

LISSANTHE MONTANA, *R.Br.*—Previously only recorded from Tasmania and the Munyong Mountains in Victoria.

Mt. Kosciusko, Sawpit Creek, 9 miles from Jindabyne, in fruit, and between 5,500 feet and summit, in flower (J. H. Maiden, January, 1898).

Mueller unites *Lissanthe montana* with *Leucopogon Hookeri* under the name of *Styphelia montana*, but in all the material examined we find the corolla lobes of *Leucopogon Hookeri* constantly densely hairy (as pointed out by Bentham) and those of *Lissanthe montana* quite glabrous, besides minor differences in the size of the flowers; the ripe fruits of *Leucopogon Hookeri* are red, and those of *Lissanthe montana* are described as white, but we have not seen ripe fruits of the latter. Both species have been collected together on Mt. Kosciusko.

The differences between the two species have been emphasised by Bentham (*B. Fl.* iii. 176), and we concur in his remarks, but Mueller continued to amalgamate the species (*Census*, 2nd ed. 1889).

EPACRIS MUCRONULATA, *R.Br.*—Previously only recorded from Tasmania.

Mt. Kosciusko, 5,500 feet to summit (J. H. Maiden, January, 1898).

Differs from the Tasmanian specimens in the herbarium of the Botanic Gardens, Sydney, and from Hooker's figure in *Flora Tasmania*, i. t. 79B. (as *E. Franklinii*) in the rather shorter and broader and more pointed leaves, but it has the comparatively long corolla-tube and short lobes by which this species is easily distinguished from all congeners.

Specimens from Tantawanglo Mt., collected by J. H. Maiden in December, 1896, appear to belong to this species, but they are past flower, and cannot be identified with certainty.

In Tasmania the species attains a height of 6 feet; on Mt. Kosciusko it forms a scrubby growth of 1-2 feet. In the Tasmanian plant the inflorescence is also more compact than in the New South Wales one.

THYMELEÆ.

PIMELEA AXIFLORA, *F.v.M.*, var. ALPINA, *F.v.M.*—Mt. Kosciusko, 5,000ft. (J. H. Maiden, January, 1898).

This variety, although hitherto recorded from Victorian alpine localities, does not appear to have been met with in New South Wales.

EUPHORBIACEÆ.

PHYLLANTHUS MITCHELLI, *Benth.*—Newcastle, N.S.W. (J. H. Maiden, August, 1897).

Previously recorded only from Queensland. It much resembles *P. thymoides*, Sieb., from which it is chiefly distinguished by the united filaments. The female plants and fruits have not yet been described, as the specimens hitherto collected are all male.

DESCRIPTIONS OF FOUR NEW SPECIES OF NEW SOUTH WALES PLANTS.

By J. H. Maiden and E. Betche.

Eugenia brachyandra, n.sp.

A tall tree glabrous in all its parts, the young branches quadrangular, with four raised lines or short wings running down the branches from the petioles. Leaves thinly coriaceous, lanceolate, acuminate, the margins slightly recurved, about 4-5 inches long and 1½ inches broad, dark green above but not shining, paler underneath and the midrib on the underside frequently of a pinkish colour, transversely veined, the pinnate veins impressed on the upper side, forming corresponding elevations on the under side; oil-glands quite concealed in the dried leaves but distinctly though faintly visible in fresh specimens, especially on the lower part of the leaves. Petioles usually under ¼ inch long. Flowers sessile on the branches of a compact terminal trichotomous panicle much shorter than the leaves. Calyx broadly campanulate, about 1½ lines diameter, shortly produced above the ovary, 5- or frequently 6-lobed, the lobes broad and scarcely ½ line long. Petals as many as the calyx-lobes and scarcely exceeding them in length; very deciduous. Stamens not exceeding the petals in length, having small versatile anthers with almost globular cells. Ovarium 2-celled, with two collateral ovules in each cell. Fruit globular, succulent, about ¾ to 1 inch diameter, reddish when ripe, marked round the top with the scar of the calyx-limb.

Ballina, N.S.W. (W. Baeuerlen, April, 1893); Tintenbar, N.S.W. (W. Baeuerlen, Dec., 1893), extending to Queensland (north coast line). In northern New South Wales known as Red Apple.

Mr. F. M. Bailey, who kindly forwarded fruiting specimens from the "North-coast line, Queensland," quite identical with our N.S. Wales specimens, expresses the opinion that it may be identical with *E. hemilampra*, F.v.M., but as the result of the examination of the abundant flowering specimens at our disposal, we do not acquiesce in that view.

Baron von Mueller described *E. hemilampra* in *Fragm.* ix. 145, from specimens without flowers or fruits, the description being so imperfect that we need not refer to it any further. Mr. Bailey adopted Baron von Mueller's name for a Johnstone River *Eugenia* fully described by him in his Botany Bulletin, No. ix. (Sept., 1894), from which our New South Wales plant differs in the following essential points:—

E. hemilampra, from Johnstone River (as described by Bailey).	*E. brachyandra*, n.sp., from N.S. Wales.
Leaves broad-lanceolate, with distinctly visible oil-dots, the upper surface shining, dotted with small pits, and with raised veins.	Leaves lanceolate, the oil-dots quite invisible in dried leaves, the upper surface not shining, smooth, with impressed veins.
Panicle loose and many-flowered.	Panicle very short and compact.
Petals falling off in a calyptra.	Petals very deciduous, not

fruit only may possibly belong to a *Memecylon*" (then follows a short description), refers in all probability to *E. brachyandra*.

VERTICORDIA DARWINIOIDES, n.sp.

An erect bushy shrub quite glabrous. Leaves opposite, linear-falcate, thick but scarcely triquetrous, about 2 lines long, obtuse, but with a fine often oblique point. Flowers terminal or in the upper axils, usually in pairs on a slender common peduncle 1 to about 2 lines in length; floral-leaves completely resembling the stem-leaves; bracteoles large, thin and scarious, yellowish, enclosing the flower-buds, and long persistent. Calyx-tube cylindrical, 5-ribbed, smooth, about 3 lines long, the lobes deeply divided into 5-8 narrow filamentous segments about twice as long as the petals. Petals ovate, about 1 line long, entire. Stamens short, with nearly globular anthers, but in the few flowers available for examination the anthers and upper parts of the filaments were nearly all eaten off by insects, so that stamens and staminodia could not be clearly distinguished. Style slender, much exserted, bearded towards the end. Ovules 2 only in the ovaria examined.

Near Dubbo (J. L. Boorman, December, 1897).

The chiefly W. Australian genus *Verticordia* has been hitherto only represented in North Australia and Queensland by *V. Cunninghamii*, Schauer, and in S. Australia by *V. Wilhelmii*, F.v.M., to which we can now add *V. darwinioides* as the only representative in N.S. Wales. It is allied to the South Australian species, with which it has the narrow calyx-tube in common, but it forms a still closer connecting link between *Darwinia* and *Verticordia* than *V. Wilhelmii* does. The general appearance of the plant is quite that of a *Darwinia*, an effect chiefly produced by the large persistent bracteoles, so uncommon in *Verticordia*, and by the comparatively inconspicuous fringes of the calyx-lobes, generally so very conspicuous in *Verticordia*; but since we wish to adhere to the generic characters laid down by Bentham and Hooker in their *Genera Plantarum*, we have no choice but to place it under *Verticordia*, in spite of its close relationship to

Darwinia. The material procured by Mr. Boorman is unfortunately scant, on account of the late season in which it was collected, so that we have only a few imperfect flowers for examination, but we hope to procure better material next season, which may necessitate some slight modification in the above description.

RULINGIA PROCUMBENS, n.sp.

A prostrate shrub with slender stems trailing closely along the ground, more or less stellate-hairy all over. Leaves on petioles generally $\frac{1}{4}$ to nearly $\frac{1}{2}$ inch in length, from ovate to ovate-lanceolate in general outline, very obtuse, 1-1$\frac{1}{2}$ inches long and up to an inch broad, deeply and irregularly crenate or almost lobed, oblique, one side of the midrib usually larger than the other, sprinkled with stellate hairs on the upper side, densely white tomentose underneath also with stellate hairs. Flowers in small leaf-opposed cymes generally not much longer than the petioles. Buds very obtuse, scarcely angular. Calyx tomentose, spreading to about 3 lines diameter. Petals with a rather broad lamina, as long as the calyx or slightly exceeding its lobes. Staminodia connivent, glabrous like the petals but shorter. Capsule stellate-tomentose and covered with very short stellate-hairy setæ.

Described in the *Handbook of the Flora of New South Wales*, p. 64, by Moore and Betche, as *Commersonia Gaudichaudi*, Gay.

small leaf-opposed cymes, generally shorter than the petioles at the time of flowering, but the fruits often on long peduncles. Buds small, obtuse, somewhat angular. Calyx tomentose, spreading to about 3 lines diameter. Petals with a narrow linear lamina shorter than the calyx-lobes. Staminodia spreading in the flowers examined, tomentose. Capsule densely covered with rather long stellate-hairy setæ; dehiscence septicidal.

Barber's Creek (between Moss Vale and Goulburn, J. H. Maiden, January, 1898).

The two Rulingias described above are both allied to the W. Australian *R. parviflora*, Endl., and to our eastern *R. hermanniæfolia*, Steetz, with which they have the prostrate habit in common. The species from Dubbo is sharply distinguished from both by the glabrous staminodia, and in addition from *R. hermanniæfolia* by the broader and longer ligula of the petals, and the foliage. The species from Barber's Creek differs from *R. hermanniæfolia* only in the shape, size and consistence of the leaves, and in the longer setæ of the capsules; the characters of the flowers are quite identical in both species. Bentham's remark under *R. parviflora* in the *Flora Australiensis* (Vol. i. p. 240) "it is much more nearly allied in character to the eastern *R. hermanniæfolia*, from which the chief differences consist in habit and foliage," applies as much to *R. prostrata*, in fact to all three species, *R. parviflora*, *hermanniæfolia*, and *prostrata*. The typical *R. hermanniæfolia* from the coast, between Port Jackson and Botany Bay, has with its small almost coriaceous leaves, a very different appearance from *R. prostrata*, yet when in the future the geographical range and the forms of this species are better ascertained it may be expedient to include it amongst the varieties of *R. hermanniæfolia*.

NOTES OF A TRIP TO MOUNT SEAVIEW, UPPER HASTINGS RIVER.

By J. H. Maiden, Botanic Gardens, Sydney.

In ordinary weather, looking west from Port Macquarie, one sees a conical peak in the clouds, perhaps sixty miles away, which is a beautiful object, particularly at the time of the setting sun. This is what is usually pointed out to visitors as Mt. Seaview, but few persons have been close to it, and I could not interview anyone who had ascended it. It is a topographical feature of much interest.

I ascended Mt. Seaview in November last, doing Oxley's celebrated journey from the Apsley to Port Macquarie in a reverse direction. In another paper, which will appear in the Agricultural Gazette of N.S.W., I have given a popular account of my trip, with especial reference to the plants observed in the Mount Seaview District. As the information is not repeated in the present paper, the attention of those interested in the subject is invited to it.

Mt. Seaview was discovered by Oxley on September 23rd,

the mountain :—"I estimate the height of this mountain at between 6,000 and 7,000 feet, and yet the country north and south appeared equally elevated. . . . . The length of the descent was two measured miles and three-quarters, and, upon first, an angle of depression of 40 degrees for 1,254 feet, we then slightly ascended 4 to 6 degrees for 4,620 feet, and from thence the descent in a continued straight line to the run of water at the base was on various angles of 28, 32, 35, 40 and 46 degrees —8,580 feet, from which I deduce the perpendicular height to be nearly 6,000 feet, which is certainly underrated."

As far as I can ascertain, no mountain has been officially called Mt. Seaview, other than Kookamerican, and this appears to be probably Oxley's Sea View, but having carefully studied the explorer's account of his journey, I cannot yet state that I feel that the particular mountain is settled beyond all doubt. The country is difficult and very mountainous, some of the mountains being difficult to define, requiring extended acquaintance.

I desire at this place to thank Mr. Gerald H. Halligan, Chief Surveyor, Public Works Department, for his kindness in devoting much time to hunting up official records in regard to Mt. Seaview, and in placing the results of his investigations at my disposal.

The great height quoted by Oxley is the foundation for the statements made in more recent maps and text-books. Baron von Mueller requested me to undertake the ascent of the mountain in 1884, believing that a rich harvest of plants would be the result of exploration of so elevated a region, and, although in later years he must have been aware that the height of the mountain is only about one-half of what it was formerly supposed to be, he still desired the ascent to be made.

On a map of the County of Macquarie, published by the Lands Department, August, 1873, Mt. Sea View or Kookamerican is stated to be 6,700 feet high. On a map of "Continental Australia," by A. J. Skene, Surveyor-General of Victoria, and engraved by W. Slight, dated December, 1885, the height of Seaview is

* Journal of an Expedition, &c. (London, 1820).

given as 6,000 feet. Banks' school map of New South Wales, adopted by the Government of New South Wales for use in State schools, and dated 1891, gives the height as 6,000 feet.

"Mt. Seaview I found to be 3,100, and not 6,700 feet as recorded on county map of Macquarie. It is not at all prominent from the north-west or south, the ranges on these sides being as high or higher than it. The range near the $\frac{TP}{5}$ (Taree and Port Macquarie) tree is 700 feet higher, and at the Myrtle Scrub at the junction of Mt. Seaview with Main Range is 1,200 feet higher." [Report of Mr. Surveyor Graeme, 9th May, 1890.]

In accordance with the above determination, the height is given at 3,100 feet on the map of the County of Hawes, published by the Lands Department in 1894.

Mr. J. F. Campbell, L.S., of Walcha, who accompanied me to Mt. Seaview, has furnished me with the following statement:—

"Until recent years the true position of Mt. Sea View was unknown to the Survey Department. Previously to 1889 (the date of its location by survey) the Department of Lands on two occasions at least sent staff officers from the tableland to fix its position, but success did not crown their efforts. In 1889 a staff surveyor was sent from Port Macquarie on the same errand, and with the assistance and information afforded by local residents, fixed on the present mountain as the Sea View of Oxley and

As I approached Seaview or Kookamerican (which is the native name of the mountain officially recognised as Mt. Seaview, and now a trigonometrical station), I found that residents of this sparsely populated district, perhaps disappointed at the height of Kookamerican, advanced claims in favour of three other heights to be considered Oxley's Seaview. They were :—(1) A mountain about three miles to the north-west of Kookamerican, and which is undoubtedly higher than Seaview. I have described this mountain in detail in an article to be published in the Agricultural Gazette of N.S.W., to which I have already referred. (2) A coasting captain pointed out as the "Sailors' Mt. Seaview" what Mr. Nivison, of Yarrowitch Station, recognised as the 2-mile siding, Myrtle Scrub. The Myrtle Scrub is referred to in the paper just quoted, and it is considerably higher than Seaview (Mr. Surveyor Graeme says 1,200 feet). The siding can be observed because of its prominence, and Mr. Nivison knows this part of the country well. (3) Banda Banda Mountain, Macleay District, but I do not entertain it for a moment, as this opinion can only be held by persons who have not studied Oxley. No. 1 is quite possible, but No. 2 cannot be supported owing (if for no other reason) to its distance from the river called the Hastings by Oxley.

The paper in the Agricultural Gazette contains a general account of the botany of the country about Mt. Seaview, and some account of the plants met with in ascending it, but following is a list of the plants collected on the very summit. Casual examination will show that they possess no interest apart from the locality in which they were found. They show at once that the elevation is not alpine, and not nearly alpine. The locality has not been previously visited by a botanist.

The two principal grasses are *Poa cæspitosa*, Forst., and Blady Grass (*Imperata arundinacea*, Cyr.); *Xerotes longifolia*, R.Br., and Bracken (*Pteris aquilina*, Linn., var. *esculenta*) were also very abundant, and these four plants covered the greatest area of ground. In addition there were *Cyperus* (probably *C. platystylis*, R.Br., but the nuts are scarcely ripe), and a grass, *Panicum*

marginatum, R.Br., var. *strictum*, identical with the figure in Trinius' Spec. Gram. ii. t. 179. There was a tree-fern (*Alsophila australis*, R.Br.) and a squatty fern (*Todea barbara*, T. Moore), on the summit, while *Lepidosperma laterale*, R.Br., *Dianella lævis*, R.Br., and *Gymnostachys anceps*, R.Br., were not rare.

There were not many trees either in number of species or of individuals. The Blackbutt referred to in the official report of the surveyor, who fixed the beacon on Mt. Seaview alongside it, is not a true Blackbutt, but a Peppermint (*Eucalyptus amygdalina*, Labill.), and must not be confused with the true Blackbutt (*E. pilularis*), which may be found lower down the mountain. This Peppermint is not rare on the higher parts of these ranges, and fills the air with an agreeable odour.

A more interesting tree at this elevation was a specimen of the Brush Box, *Tristania conferta*, R.Br., which had, however, rather suffered from the wind. At the beacon was the Blueberry tree (*Elaeocarpus cyaneus*, Ait.), while there were several Honeysuckles (*Banksia integrifolia*, Linn., f.). Amongst shrubs there were *Persoonia lucida*, R.Br., and *P. linearis*, Andr., *Lomatia silaifolia*, R.Br., and *Hakea eriantha*, R.Br., with narrow leaves up to 8 inches long (all belonging to the Proteaceæ); *Westringia glabra*, R.Br., and *Prostanthera nivea*, A. Cunn., both labiate plants well worthy of cultivation because of their pleasing lavender-coloured flowers. *Solanum violaceum*, R.Br., with green globular

Anzia angustata, Pers., *Parmelia polycarpa*, Taylor, and *P. tenuissima*, Taylor, all from Mt. Seaview; *Lecidea ferax*, Muell. Arg., Mt. Maiden; *Usnea barbata*, Linn., var. *ceratina*, Hastings River; *Cladonia fimbriata*, Huds., Long Flat, Hastings River; and *Parmelia conspersa*, Ehr., Tia, New England.

On the tops of mountains higher than Mt. Seaview, and also in situations not much higher than the Hastings River, I found an arboreal *Daviesia*. It is a handsome tree with drooping branches. On the average it was, say, 25 feet high, with a trunk diameter of 1 foot. It had corky, deeply furrowed bark, and white wood. In habit it reminds one of *Acacia implexa*, and the bark might readily be mistaken for *Casuarina suberosa* or *C. torulosa*. I was under the impression that this *Daviesia* had not been previously recorded from New South Wales, but the Rev. B. Scortechini (*loc. cit. infra*) traced it to the Tweed River from Queensland. It was imperfectly described by W. Hill as No. 219, page 22, of his Catalogue of the Collection of Queensland Timbers, published for the Sydney International Exhibition of 1879. He describes it as "Queenwood. Diameter, 6 to 12 inches; height, 15 to 30 feet. A very ornamental, spreading, drooping tree, with bright green foliage; occurring upon the Darlington Ranges. Its wood is hard, close-grained, with beautiful pink streaked lines, and takes a beautiful polish. It is destined to take a prominent position with cabinet-makers, also for decorative plantations."

In the Proceedings of this Society, Vol. vii p. 221, in a paper by Rev. B. Scortechini, the name *Daviesia arborea* is adopted as of "F.v.M. and B. Scort., ined."; and although the tree is described more fully than by Hill, it is not described in a formal botanical manner by either, and if the name *arborea* should stand for it, W. Hill must be given as the author. *D. arborea*, F.v.M. and Scort., was quoted in Mueller's Census (1st Edition, 1882), and suppressed in the 2nd Edition (1889) of the same work, being included under *D. corymbosa*. I certainly think reference should be made to its tree-stature, so unusual in the genus, and therefore propose that it be called *D. corymbosa*, var. *arborea*.

Potamophila parviflora, R.Br., is an interesting grass, the genus comprising but one species endemic in Australia. Bentham (*B.Fl.* vii. 550) records it from "Williams River, R. Brown; Hastings River, Beckler; the specimens few, and not seen in any other collection." I found it in fair quantity both in the Upper and Lower Hastings. It is a tall, pale-coloured, erect, cane-like grass, forming large tussocks in the water often several feet in diameter. It is cropped by cattle wherever they can reach it, and is probably a nutritious grass. It occurs in the stony bed of the limpid stream, always more or less submerged, probably because cattle have eaten it out close to the bank.

I now proceed to give some account of the Eucalypts found on Mt. Seaview.*

Eucalyptus amygdalina, Labill.—This tree (Peppermint) occurs on the summits of Mt. Seaview and of the other mountains visited, being very plentiful in some places. The bark is rough at the butt, and more or less blackish, hence it is sometimes called Blackbutt, but it must not be confused with the true Blackbutt (*E. pilularis*). The tree at the beacon on the summit of Mt. Seaview, and officially referred to as Blackbutt, is *E. amygdalina*. No seedlings or suckers were available, and barely ripe fruit, but I do not doubt that the form of *E. amygdalina* on these ranges is the var. *latifolia* (Deane and Maiden) described in the Proc. of this Society [x. (2nd Ser.) 609]. The foliage and

E. pilularis, Sm. (Blackbutt), occurs near the summit of Mt. Seaview and adjacent heights. The fruits are perhaps a little smaller than is usual in the species.

E. Sieberiana, F.v.M.—There is a tree, which is sometimes called "Messmate," which occurs near the summit of Mt. Seaview and also on Mt. Maiden, Seaview Range. It is similar to that collected by me in the Glenfernie Forest Reserve* and other places along the Grafton-Armidale road. Mr. Henry Deane has collected it at the Bluff River, Tenterfield. The bark is persistent on the trunk; the branches and branchlets are smooth. At present this tree had better be classified with *E. Sieberiana*, but in the shape and rim of the fruit, and in some other respects, the tree shows affinities to *E. hæmastoma*. It may turn out to be a new species, and is under examination.

E. eugenioides, Sieb., and *E. capitellata*, Sm.—The Stringybarks on the Seaview Range are interesting.

E. eugenioides occurs nearly on the summit of Mt. Seaview. It has globular heads of about $\frac{7}{16}$ inch in diameter, composed usually of 9 or 10 small pale-coloured fruits about $\frac{3}{16}$ inch in diameter.

The Stringybark on the range ascending to New England had fruits much of the same character except that both heads and individual fruits are a little larger, and since they contain one or two more fruits to the head, the individual fruits are more compressed, after the fashion of *E. capitellata*.

Usually the Stringybarks have not the fruits in compact globular heads; those mostly found on the table-land, and also from the Upper Hastings, near Mt. Seaview, are $\frac{4}{16}$ or $\frac{5}{16}$ inch in diameter, six or seven in a loose head, and each fruit with a distinct pedicel.

Other specimens from Yarrowitch, New England, are small and few in the head.

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* See *Agricultural Gazette* of N.S.W. September, 1894, p. 612.

E. macrorrhyncha, F.v.M.—Near the summit of Mt. Seaview there occurs a Stringybark with large fruits undoubtedly belonging to this species. The fruits are similar to those collected by Mr. R. T. Baker, Gulf Rd., Rylstone,* except that the rim is a little more domed and the valves a little more exserted, probably because the Seaview specimens are a little riper. In my opinion Mr. Baker's specimens are now undoubtedly to be referred to *E. macrorrhyncha*, a point in regard to which Mr. Deane and myself had some doubt (*loc. cit.*).

NOTES AND EXHIBITS.

Mr. Fred. Turner exhibited a collection of indigenous economic plants collected on the Liverpool Plains.

WEDNESDAY, 27TH APRIL, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, April 27th, 1898.

P. N. Trebeck, Esq., J.P., in the Chair.

DONATIONS.

Zoologischer Anzeiger. xxi. Band. Nos. 553-554 (Feb.-March, 1898). *From the Editor.*

Société Royale de Géographie d'Anvers—Bulletin. Tome xxi. 3e Fasc. (1898). *From the Society.*

L'Académie Impériale des Sciences de St. Pétersbourg—Annuaire du Musée Zoologique, 1897. No. 4. *From the Academy.*

Nederlandsche Entomologische Vereeniging—Tijdschrift voor Entomologie. xl. Deel. Jaargang 1897. 3de-4de Afl. *From the Society.*

Geological Society, London—Quarterly Journal. Vol. liv. Part 1, (No. 213; Feb. 1898); Geological Literature during the Year 1897. *From the Society.*

Museu Paulista, S. Paulo—Revista. Vol. ii. (1897). *From the Director.*

Department of Agriculture, Perth, W.A.—Journal. Vol. iv. Nos. 24-26 (Nov.-Dec., 1897): Producers' Gazette and Settlers' Record. Vol. v. Part 2. New Issue (Feb., 1898): Two Pamphlets —Advantages of Early Sowing and Facts for Farmers, &c. Feb., 1898). *From the Secretary.*

Department of Mines, Perth, W.A.—Reports in connection with the Water Supply of the Goldfields (1897). *From the Government Geologist.*

Société d'Horticulture du Doubs, Besançon-les-Bains—Bulletin. Série illustrée. No. 26 (Feb., 1898). *From the Society.*

Three Pamphlets—Sur les Observatoires Météorologiques de l'Océan Atlantique (4to. 1898); Sur la Quatrième Campagne Scientifique de la "Princesse-Alice" (4to. 1898); Sur le Développement des Tortues (8vo. 1898). Par S.A.S. le Prince Albert 1er de Monaco. *From the Author.*

Perak Government Gazette. Vol. xi. Nos. 6-8 (Feb.-March, 1898). *From the Government Secretary.*

Royal Microscopical Society, London—Journal, 1898. Part 1 (Feb., 1898). *From the Society.*

American Museum of Natural History, N.Y.—Bulletin. Vol. x. Articles ii.-iii. (pp. 15-50; Feb., 1898). *From the Museum.*

Department of Mines, S.A.—Record of the Mines of South Australia: The Mannahill Goldfield, with Notes and Plans. By H. Y. L. Brown, F.G.S. (1898). *From the Government Geologist.*

Johns Hopkins University, Baltimore—Hospital Bulletin. Vol. ix. Nos. 83-84 (Feb.-March, 1898). *From the University.*

Manchester Literary and Philosophical Society—Memoirs and Proceedings. Vol. xli. (1896-97). *From the Society.*

Royal Society, London—Proceedings. Vol. lxii. No. 385 (March, 1898); Year-book for 1897-98 (No. 2). *From the Society.*

Zoological Society of London—Abstract, 1st March, 1898. *From the Society.*

Naturhistoriske Forening i Kjöbenhavn—Videnskabelige Meddelelser for Aaret 1897. *From the Society.*

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NEW GENERA AND SPECIES OF FISHES.

By J. Douglas Ogilby.

TACHISURINÆ.

Cinetodus, gen.nov.

Head somewhat depressed, wider than deep, the upper profile linear and moderately oblique. Mouth small and crescentic, the upper jaw slightly projecting; lips thin, without posterior lobe; no preorbital cavity. Jaws with broad bands of small, conical, acute teeth; palatines anteriorly with a patch of similar teeth implanted upon a movable cushion; no vomerine nor posterior palatine patches. Barbels six, two maxillary and four mental, the former of moderate length and slender. Eyes small and lateral. Gill-openings restricted, narrower than the isthmus; gill-membranes partially united, broadly attached to the isthmus; five branchiostegals; gill-rakers short, stout, few in number. Axillary pore present. Dorsal fin inserted above the interspace between the pectorals and ventrals; adipose fin moderate, opposite to the anal. Occiput rounded; nuchal crest conspicuous. Occipital fontanelle narrower and much shorter than the inter-

and slender. Eyes rather large, lateral, high. Gill-openings rather wide, much wider than the isthmus; gill-membranes united, attached to the isthmus along the median line, the free margin interrupted; six branchiostegals; gill-rakers short, stout, compressed, remiform, rather numerous. Axillary pore present. Dorsal fin originating midway between the pectorals and ventrals; adipose fin moderate, entirely above the anal. Occiput rounded; nuchal crest rather feeble. Occipital fontanelle dilated and subcircular, much shorter than the interorbital; a large supraorbital fontanelle; otic fonticle slit-like.

Etymology:—*νηδύς*, womb; *στόμα*, mouth.

Type:—*Hemipimelodus dayi*, Ramsay & Ogilby.

Distribution:—Rivers of southern New Guinea.

PACHYULA, gen.nov.

Head depressed anteriorly, wider than deep, the nuchal region elevated. Mouth small and transverse, the upper jaw well projecting and somewhat gibbous anteriorly; lips thick, the upper terminating in a broad free lobe. Jaws with bands of villiform teeth, that of the premaxillaries wide and transversely divided by a naked groove, behind which the teeth are smaller and decumbent; mandibular band narrow; vomer and palatines toothless. Barbels six, two maxillary and four mental, the former short and slender. Eyes very small, supero-lateral. Gill-openings somewhat restricted, wider than the isthmus; gill-membranes united, attached to the isthmus along the median line, leaving a narrow margin free; five branchiostegals; gill-rakers small, conical, in moderate number. Axillary pore present. Dorsal fin originating much nearer to the pectorals than to the ventrals; adipose fin rather long and low, originating well in advance of the anal. Occiput feebly and obtusely ridged; nuchal crest prominent. Occipital fontanelle dilated and cordiform, shorter than the interorbital; a large supraorbital fontanelle; otic fonticle replaced by an angular sulcus.

Etymology:—*παχύς*, thick; *δυλα*, gums.

Type:—*Hemipimelodus crassilabris*, Ramsay & Ogilby.

Distribution:—Rivers of southern New Guinea.

ARIUS MASTERSI, sp.nov.

Arius gagorides (not Cuvier & Valenciennes) Macleay, Proc. Linn. Soc. N.S. Wales, vi. 1881, p. 213, Port Darwin.

D. i 7, 0. A. 17.

Depth of body 5, length of head $3\frac{4}{5}$ in the total length; width of head $\frac{5}{6}$ of its length. Eye with superiorly adnate lid, its diameter $6\frac{1}{2}$ in the length of the head and $2\frac{1}{2}$ in that of the snout, which is subtruncate and $\frac{1}{2}$ wider than long. Interorbital region gently rounded, its width $\frac{3}{4}$ of that of the mouth and $\frac{2}{5}$ of the length of the head. Premaxillary teeth in a wide continuous band, which is slightly emarginate behind and obliquely truncated at the extremities, the width of each half rather more than a third of its length; mandibular band slightly tapering distally; vomerine and palatine teeth in three patches on each side, the vomerine and anterior palatine patches confluent, the former being together much longer than either of the latter; posterior patches oval, narrowly separated from the anterior, the least space between them as wide as one of the patches. Maxillary barbel subequal in length to the head, extending to the middle of or slightly beyond the humeral process; postmental barbel $\frac{3}{4}$ to $\frac{5}{6}$ of the maxillary, inserted somewhat behind and outside the mental, which reaches a little beyond the gill-opening. Cranial shield evenly and coarsely granular, the granulation extending

proximal $\frac{3}{7}$ of the pectoral spine. Gill-membranes meeting at a very obtuse angle; width of isthmus about $\frac{1}{4}$ of the gill-slit; gill-rakers 5 + 8, the longest rather more than $\frac{1}{2}$ of the diameter of the eye. Distance of dorsal fin from tip of snout $2\frac{4}{5}$ in the total length; dorsal spine granular in front, feebly serrated behind, the sides coarsely striated, its length $\frac{5}{7}$ of that of the head; adipose fin longer than high, as long as the dorsal, its distance from which is $3\frac{1}{3}$ in the total length: anal fin emarginate, higher than long, its length $\frac{5}{9}$ of the head: ventral rounded, $\frac{3}{5}$ of the head, and not quite reaching to the anal: pectoral with 10 soft rays, the spine strong, similar to that of the dorsal, and $\frac{3}{4}$ of the head: upper caudal lobe much longer than the head, $3\frac{1}{3}$ in the total length; least depth of caudal peduncle $2\frac{1}{3}$ in its length behind the adipose fin. Axillary pore minute. Vent midway between the ventrals and anal.

Silvery, the back strongly washed with blue.

Etymology:—Named for Mr. George Masters, Curator of the Macleay Museum, Sydney University, to whom I am indebted for much valuable information on the fine collection under his charge, and whose general knowledge of the Australian fauna is possibly exceeded by none.

Type in the University Museum.

Total length 255 millimeters.

Distribution:—Northern Australia.

From *Arius thalassinus*, the only other oriental Tachisurid which possesses three distinct groups of teeth on each side of the roof of the mouth, *A. mastersi* differs in having a smaller eye, larger mouth, wider patch of vomerine teeth, smaller, more widely separated, oval patches of posterior palatines, longer maxillary barbels, coarsely granular head-shields, shorter and broader nuchal shield, larger saddle-shaped dorsal plate, granular humeral process, coarsely striated dorsal spine, larger adipose fin, &c.

In outward appearance this species approaches more closely to *Hexanematichthys sagor* than to any other, but the presence of distinct posterior palatine patches of teeth at once distinguishes it therefrom, while—as compared with a Burmese example of

sagor in the Australian Museum (Day collection)—the head is smaller, eye larger, barbels shorter, opercles and anterior portion of the lateral line smooth, adipose fin larger, &c.

The resemblance to *Arius sona* (=*gagorides*) is superficial.

In restricting the generic name *Arius* to *grandicassis* and its allies, I am keenly aware that I am acting in opposition to the published opinions of such high authorities as Drs. Jordan, Gill, Eigenmann, and others; nevertheless, *grandicassis* being the first species described by Valenciennes under the new generic name *Arius*, and no other species having been categorically proposed by that author as the type, I fail to perceive by what right Dr. Bleeker could arbitrarily select from among the remaining species included in the genus by its original founder any other type; and the fact that in place of a South American villiform-toothed fish, Dr. Bleeker selected an East Indian granular-toothed species, belonging to Lacépède's earlier genus *Tachisurus*, as his type, is an additional and most potent reason why Dr. Bleeker's arbitrary action should be disregarded, and the name *Arius*, instead of being reduced to a synonym of *Tachisurus*, should be allowed to remain in undisturbed possession of those species having villiform palatine teeth with a backward projection along the inner margin of the bone, to which the names *Netuma* and *Notarius* have been given by Drs. Bleeker and Gill respectively.

circular, photophore between the upper portion of the anteorbital photophore and the antero-superior angle of the eye on either side, but separated from both by a narrow interspace. Cleft of mouth oblique and slightly curved, the maxillary nearly reaching to the angle of the preopercle. Eye large, with well developed adipose lid, its diameter $\frac{3}{8}$ of the length of the head. Interorbital region convex, its width rather more than the diameter of the eye; the supraorbital bone forming an acute overhanging ridge. Opercle notched posteriorly, its lower portion the longer, but not produced backwards so far as the acute subopercle. Origin of the dorsal slightly in advance of the vertical from that of the ventral, which is directly below the base of the first articulated ray, which is the highest, a little longer than the base of the fin and $\frac{3}{4}$ of the length of the head; base of last dorsal ray slightly in advance of the origin of the anal: adipose fin narrow, tapering, its length $\frac{3}{8}$ of the diameter of the eye, inserted midway between the dorsal and the base of the caudal and a little behind the vertical from the last anal ray: anal fin shorter and lower than the dorsal, its length $\frac{4}{5}$ of its distance from the caudal: ventral with eight rays, the space between its origin and the tip of the mandible $\frac{2}{3}$ of its distance from the base of the caudal and slightly anterior to a point equidistant from the base of the adipose fin and the front margin of the eye; its length is $\frac{5}{9}$ of that of the head and it does not nearly reach to the anal: pectoral pointed, with eleven rays, scarcely half the length of the head and not quite reaching to the vertical from the origin of the ventral: caudal forked, about $\frac{1}{4}$ of the total length, the least depth of the peduncle $2\frac{1}{3}$ in the depth of the body. Scales smooth, those of the lateral line somewhat enlarged and notched posteriorly, with the tubes very conspicuous; lateral line without anterior curve. In addition to the anteorbital and its supernumerary photophores there are two luminous spots on the opercle, one between the posterior half of the eye and the upper jaw, three on each side of the mandible, and one inside the mouth below the maxillary one; there is also a large luminous spot above the base of the pectoral. The arrangement of the body photophores is as follows—five thoracic,

sagor in the Australian Museum (Day collection)—the head is smaller, eye larger, barbels shorter, opercles and anterior portion of the lateral line smooth, adipose fin larger, &c.

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MYCTOPHIDÆ.

ÆTHOPRORA PERSPICILLATA.

D. iii 14. A. ii 13. Sc. 36.

Depth of body $4\frac{1}{3}$, length of head $3\frac{1}{2}$ in the total length; depth of head $\frac{3}{4}$ of its length. Snout very short, obtuse, and declivous, vertically divided into two portions by a delicate scale-like ridge. Luminous organ large, covering the entire front of the snout but separated from the eye by a conspicuous interspace, its posterior lobe prolonged backwards beyond the front margin of the eye and scarcely separated from its antero-inferior angle; a smaller,

forming an S-shaped band between the throat and the base of the ventral; one pectoral, on the base of that fin; three anterolaterals, one just inside the tip of the pectoral rays, one a little behind the vertical from the base of the ventral and rather nearer to it than to the lateral line, and the third much lower on the side above the middle of the ventral fin; between the ventrals and the anal the body is badly mutilated, but three are visible the two anterior being well separated, the place of the missing photophore corresponding vertically to that of the third anterolateral; three mediolaterals, the lower pair on nearly the same horizontal plane, the one a little before the other a little behind the vertical from the origin of the anal, the third nearly above the first, on the lateral line; five anal and five postanal, the fourth and fifth in both cases separated by a wide interval; two posterolaterals, the lower corresponding to the anal interval and not much higher on the side than the anal series, the upper close to the lateral line; and two caudal.

Blackish, growing slightly paler on the sides and below; lower jaw grayish-white with a broad blackish crossband below the eye: caudal fin whitish: photophores pearly with a blackish rim.

Etymology:—*perspicillata*, spectacled; in reference to the pair of supernumerary photophores in front of the eyes.

Type in my possession.

Distribution:—A single specimen of this interesting fish was obtained by my collector at Lord Howe Island, having been washed ashore after the recent heavy gale.* It measured 62 millimeters to the end of the middle caudal rays. The specimen is unfortunately badly mutilated, being almost broken in two just behind the termination of the anal fin, and also injured along the ventral surface which is burst open, exposing to view an enormous mass of minute ova. Any shortcomings in the above

* I have to return my best thanks to J. Brodie, Esq., the Visiting Magistrate of the Island, for the interest which he has taken in obtaining specimens of the fishes inhabiting the seas of the Island for me.

forming an S-shaped band between the throat and the base of the ventral; one pectoral, on the base of that fin; three anterolaterals, one just inside the tip of the pectoral rays, one a little behind the vertical from the base of the ventral and rather nearer to it than to the lateral line, and the third much lower on the side above the middle of the ventral fin; between the ventrals and the anal the body is badly mutilated, but three are visible the two anterior being well separated, the place of the missing photophore corresponding vertically to that of the third anterolateral; three mediolaterals, the lower pair on nearly the same horizontal plane, the one a little before the other a little behind the vertical from the origin of the anal, the third nearly above the first, on the lateral line; five anal and five postanal, the fourth and fifth in both cases separated by a wide interval; two posterolaterals, the lower corresponding to the anal interval and not much higher on the side than the anal series, the upper close to the lateral line; and two caudal.

Blackish, growing slightly paler on the sides and below; lower jaw grayish-white with a broad blackish crossband below the eye: caudal fin whitish: photophores pearly with a blackish rim.

Etymology:—*perspicillata*, spectacled; in reference to the pair of supernumerary photophores in front of the eyes.

Type in my possession.

Distribution:—A single specimen of this interesting fish

description will I trust be pardoned on account of the condition of the specimen.

Three species of *Æthoprora* have already been described, the best known being *Æ. metopoclampa* (Cocco), which has as yet been captured only in the Mediterranean and of which but eight examples have come under the notice of scientific writers. It has, however, had the advantage of being figured in no less than four different works, and in view of the fact that my species was breeding or just about to breed the following remarks by Drs. Goode and Bean are both interesting and instructive:—"The great extension and elaboration of the nasal luminous plate shown in the figure, may be due to sexual conditions. At all events, as has been remarked, it is unlike that shown by Raffaele, though sufficiently similar to that of Cocco and Bonaparte" (*Oceanic Ichthyology, p.* 87). Care should be taken in describing other species of Pacific *Æthoprora*, not to lay too great stress on a somewhat more restricted development of the anteorbital photophore, where other characters agree with those given above.

The two other species belong to the fauna of the North Atlantic; one of them, *Æ. effulgens*, is known from two specimens, the first of which was taken from the stomach of a cod, while the second was dredged by the "Albatross" in 1639 fathoms, the remaining species, *Æ. lucida*, being taken at the same time.

From all three the Pacific fish may be distinguished by the presence of an additional frontal photophore lying between the upper end of the anteorbital and the antero-superior angle of the eye, as well as by the conspicuous non-glandular interspace between the front margin of the eye and the anteorbital photophore, and by the increased number of lateral photophores.

Although this is the first species of *Æthoprora* definitely recorded from the Pacific and Indian Oceans the *Scopelus* mentioned by Dr. Alcock (Ann. & Mag. Nat. Hist. (6) vi. 1890, p. 219) as having been "taken from the stomach of a *Trigla hemisticta*" in the Bay of Bengal, and possessing "a conspicuous luminous organ immediately in front of the eye" may have belonged to this genus.

PLATYCEPHALIDÆ.

THYSANOPHRYS, gen.nov.

Body rather short, stout, and somewhat depressed, covered with moderate rough scales, which are partly ciliated and partly cycloid. Lateral line complete, extending on the caudal fin, the tubes widely bifurcate and occupying the entire length of the scale. Head broad and much depressed, mostly naked. Mouth anterior, with large, slightly oblique cleft, the lower jaw projecting; premaxillaries slightly protractile; maxillary lateral, partly exposed, without supplemental bone. Teeth villiform, in bands on the jaws and palatines, in two subovate patches on the vomer; pterygoids and tongue smooth. Nostrils approximate, the anterior with a tentacle. Eyes superior, close together, the lids with dermal appendages. Angle of preopercle produced and spinigerous; opercle with two widely divergent spines; no subopercular appendage. Branchiostegals seven; gill-rakers short, stout, spinulose, few in number. Two separate dorsal fins, with viii, 12 rays, the second the longer; anal with 11 soft rays, similar to the second dorsal; ventrals large and widely separated, inserted behind the pectorals, with i 5 rays, the fourth the longest; pectorals moderate, rounded, with 20 rays, the upper middle ones the longest; caudal rounded. Posterior processes of the premaxillaries not extending to the frontals; prefrontal and supraorbital

posterior to this and in a line with it is a long ridge ending in a spine on the pterotic; the supraoccipital has a low, irregular, V-shaped ridge in its middle line, and the parietal has a prominent spine just external to this; the epiotic is like a scale on the greatly developed opisthotic, and ends in a sharp point, which does not stand out like a spine; opisthotic greatly produced posteriorly, terminating in a prominent spine.

ATHERINIDÆ.

TÆNIOMEMBRAS, gen.nov.

Body elongate and compressed, the abdomen rounded, covered with moderate, adherent, cycloid scales. Head small, a little deeper than wide, with moderate, pointed snout, partially scaly, the snout, interorbital region, and preopercular border naked and provided with series of large open pores. Mouth terminal, small, with oblique cleft; jaws subequal, with the edges nearly linear. Premaxillaries narrow throughout, protractile, the skin not continuous with that of the forehead; maxillary almost entirely concealed beneath the preorbital, not extending backwards to the eye. Upper jaw with several, lower with a single series of small, conical teeth; palatine teeth uniserial, strong; vomer, pterygoids, and tongue smooth. Eyes lateral, without adipose lid. Six branchiostegals; gill-rakers short and stout. Two widely separated dorsal fins, with vi-viii, i 9-11 rays, the spinous ones flexible anal originating below the dorsal interspace, with i 10-12 rays; ventrals small, well separated, with a feeble spine and 5 soft rays, without intermediate scaly process; pectorals high, with 12-14 rays, the upper the longest; caudal forked, the peduncle slender. Vent situated below the first dorsal. Vertebræ 42.

Etymology:—*ταινίος*, slender; *Membras*, a related genus = *Atherina*.

Type:—*Atherina microstoma*, Günther.

Distribution:—Atherinids from the fresh and brackish waters of Tasmania, allied to *Atherina*, but differing in the more elongate body, pointed snout, small mouth, stronger dentition, shorter, stouter and fewer gill-rakers, &c.

NEW AUSTRALIAN LEPIDOPTERA: WITH A NOTE ON *DEILEPHILA LIVORNICA*, Esp.

By Oswald B. Lower, F.E.S.

MONOCTENIADÆ.

Arrhodia porphyropa, n sp.

♂. 28 mm. Head, thorax and abdomen pale purplish-lilac, palpi dark purple, anterior legs dark purple, tibiæ and tarsi greyish, posterior and middle legs greyish mixed with pale lilac. Antennæ ochreous, pectinations about 1½ at greatest length. Forewings elongate-triangular, hindmargin gently bowed; pale lilac mixed with purple; a broad transverse ferruginous-red fascia, broadest on costa, edged on both sides throughout by a line of ochreous; anterior edge nearly straight, from ⅖ of costa to middle of inner margin; posterior edge from beyond ⅗ of costa to beyond middle of inner margin, angulated outwards in middle; the ground colour on either side of the fascia darker; a fuscous lunate discal spot: cilia deep purplish, terminal third sharply whitish. Hindwings with hindmargin rounded; colour as in fore-wings but lighter towards base; a faintly indicated darker lil-

ochreous, apical $\frac{2}{5}$ simple, fillet snow-white. Palpi ochreous, beneath white. Legs flesh-colour, anterior coxæ whitish. Forewings elongate-triangular; costa gently arched, nearly straight, hindmargin obliquely rounded, hardly waved; pale ochreous-reddish, darker at base; two faint irregular fuscous lines from costa at $\frac{1}{5}$ and $\frac{2}{5}$ not reaching inner margin; an outwards curved transverse row of blackish dots from costa just before $\frac{3}{4}$ to near anal angle but there lost in ground colour; a hindmarginal row of minute fuscous dots: cilia dull reddish-ochreous. Hindwings with hindmargin slightly waved, somewhat produced on vein 4; second line as in forewings, first and third absent; a moderate roundish snow-white discal spot finely edged with fuscous before middle; a very fine fuscous hindmarginal line; cilia as in forewings.

Mackay, Queensland; one specimen at electric light in December.

EUCHLORIS (?) TETRALOPHA, n.sp.

♀. 30 mm. Head and thorax yellowish-green, abdomen ochreous-whitish mixed with pinkish, and with four raised coppery metallic crests more or less edged with spots of black on middle segments. Antennæ, palpi, and legs pale ochreous-yellowish. Forewings elongate-triangular, hindmargin waved, rather strongly bowed in middle; pale yellowish-green somewhat shining; costal edge faintly strigulated throughout with fuscous-reddish; an obscure fuscous dot at $\frac{1}{3}$ from base above middle; a moderate suffused pinkish-fuscous spot at anal angle, a silvery white subterminal streak; a fine waved fuscous hindmarginal line: cilia fleshy-pink. Hindwings with hindmargin waved and with a strong projection in middle; colour—hindmarginal line, subterminal streak and cilia as in forewings; discal and anal spots absent; underside of wings pale ochreous-whitish; a dull pinkish-fuscous spot at anal angle of forewings; a larger similar spot on costa at apex of hindwings.

Mackay, Queensland; one specimen in December.

A species of doubtful affinity, easily known by the metallic abdominal crests.

ELPHOS HYPOCALLISTIS, n.sp.

♂. 64 mm. Head, palpi, legs, thorax, antennæ and abdomen dark fuscous, posterior tibiæ somewhat swollen. Antennæ bipectinated to apex, greatest length 4. Thorax with suffused dark fuscous anterior band. Forewings elongate-triangular; hindmargin waved, rounded, dull whitish, almost wholly obscured with spots and transverse waved lines causing an appearance of being wholly fuscous; a strongly waved dark fuscous line from $\frac{1}{8}$ costa to $\frac{1}{6}$ inner margin becoming double posteriorly on lower half; a second similar line from before middle of costa to $\frac{1}{3}$ inner margin, angulated strongly outwards below costa and containing a larger darker suffused discal spot in angulation; a third very strongly waved double on upper $\frac{2}{3}$, from about $\frac{3}{5}$ costa to inner margin close beyond termination of previous line, the ground colour more prominent on interspace; a fourth strongly waved line from costa at $\frac{5}{6}$ to anal angle, becoming double on lower $\frac{3}{4}$; a large ochreous-whitish apical patch containing a suffused triangular spot of fuscous on costa and several fine fuscous dots; a hindmarginal row of dark fuscous lunules: cilia whitish with a median lunular fuscous line. Hindwings with hindmargin

PSEUDOTERPNA CASTANEA, n.sp.

♂. 40 mm. Head, palpi, thorax and abdomen grey-whitish, collar narrowly chestnut-brown. Antennæ whitish, pectinations at greatest length 3, pale ochreous, pectinations continued to apex. Forewings elongate-triangular; costa straight, hindmargin crenulate; pale ochreous; a fine chestnut-brown line beneath costa from base to about $\frac{1}{4}$ edged by its own width of ochreous-whitish above; 2 or 3 longitudinal streaks of chestnut-brown between this and costa; a waved streak from inner margin at $\frac{1}{6}$ to extremity of first-mentioned streak; a broad lighter median fascia from beyond middle of costa to middle of inner margin, anterior edge well defined, angulated immediately beneath costa and in middle, posterior edge hardly traceable except above inner margin where it is dark fuscous; a suffused fuscous spot on costa just before apex, followed by a triangular white spot, whence proceeds a moderate whitish subterminal line mixed with spots of chestnut-brown throughout but more distinct above middle; a fine chestnut-brown hindmarginal line almost obsolete on upper half. Hindwings with hindmargin crenulate, more prominent in middle; colour and markings as in forewings, but first line absent, and subterminal line edged on either side with a line of brown. Underside of forewings with a transverse reddish-fuscous patch at $\frac{3}{4}$ of costa, more or less suffusedly continued across wing to half. Hindwings with a large roundish dark fuscous apical patch.

Liverpool, New South Wales; one specimen (Coll. Lyell) taken on "Tea-tree."

The species under notice bears a close superficial resemblance to some species of *Selidosema*. Mr. Lyell informs me that the larvæ spin a silky cocoon on the "Tea-tree," the bark of which the imago closely resembles.

PHYCIDIDÆ.

SALEBRIA PLACOXANTHA, n.sp.

♀. 12 mm. Head, palpi, and thorax whitish-ochreous, terminal joint of palpi fuscous externally. Antennæ fuscous, annulated

with white. Legs whitish, tibiæ and tarsi fuscous-tinged. Abdomen greyish-ochreous. Forewings elongate, narrow, posteriorly dilated; whitish finely irrorated with blackish; a broad yellowish-ochreous fascia beyond $\frac{1}{3}$ of inner margin, constricted above, reaching $\frac{2}{3}$ across wing; anterior edge suffused; posterior edge edged finely with blackish scales, beyond this a moderate clear white patch of ground colour; a small black spot on inner margin on anterior edge of ochreous patch, ground colour between base and patch pale ochreous except towards costa; a suffused blackish spot in disc at $\frac{2}{3}$; a very irregular suffused nearly straight line of blackish scales from costa at apex to $\frac{5}{6}$ of inner margin, edged posteriorly by a line of clear white; a suffused blackish line along hindmargin, edged internally with clear white, space between the two lines clear ochreous: cilia greyish-ochreous mixed with white and blackish at base. Hindwings greyish, becoming fuscous-tinged round hindmargin and apex, and with a fine fuscous hind-marginal line; cilia grey, with a fuscous basal line.

Broken Hill, N.S.W.; one specimen in September.

CATEREMNA METALLOPA, n.sp.

♂. 18 mm. Head, thorax, and antennæ ochreous, strongly infuscated; palpi fuscous. Anterior legs ochreous-reddish above, whitish-ochreous beneath; posterior and middle pair ochreous-

more fiery-reddish: cilia ochreous-greyish, with a rather thick fuscous median line. Hindwings pale ochreous, somewhat shining, becoming pale greenish-bronze along costa; a moderate light fuscous hindmarginal shade attenuated and almost obliterated at anal angle; cilia greyish.

Mackay, Queensland; one specimen in December.

TORTRICIDÆ.

ACROPOLITIS (?) HELIOCHARES, n.sp.

♂. 20 mm. Head, palpi, thorax, abdomen and legs dark fuscous, face yellowish, patagia yellow. Antennal ciliations very short. Posterior legs grey-whitish. Forewings elongate, moderate, costa gently arched, apex hardly pointed, hindmargin oblique, slightly sinuate beneath apex; 7 and 8 stalked, 7 to hindmargin; bright yellow; a narrow fuscous streak along costa from base to $\frac{3}{5}$, attenuated at extremities; a broad dark fuscous band, its anterior edge curved, well defined from extremity of costal streak to inner margin beyond middle, posterior edge suffused, inwards curved, from beyond $\frac{4}{5}$ of costa to hindmargin above anal angle; hindmarginal area of wing mixed with dull ochreous and fuscous, becoming darker along hindmargin: cilia greyish-fuscous, becoming ochreous on costa and at anal angle, with a suffused fuscous tooth below apex. Hindwings with veins 3 and 4 widely separate, 6 and 7 stalked; dark fuscous becoming almost clear whitish on basal half and with a black mark at anal angle; cilia grey-whitish with a fuscous basal line.

Victoria; one specimen in November.

A curious and beautiful species doubtfully referable to this genus. There is a curious swollen ridge-like organ on the hindwings, from about $\frac{1}{3}$ and continued along the stem of veins 6 and 7 and apparently ending just below 6. The palpi and costal fold are different from any other described *Acropolitis* with which I am acquainted.

ANATROPIA IRIODES, n.sp.

♀. 15 mm. Head, palpi, and antennæ black. Palpi exposed about $\frac{1}{3}$ of second. Thorax blackish. Patagia whitish, posteriorly bluish-metallic. Abdomen dark fuscous, beneath ochreous-whitish. Legs fuscous, banded with whitish, posterior pair ochreous-whitish. Forewings elongate, moderate, costa gently arched, hindmargin obliquely rounded; 7 and 8 stalked; white; a narrow bluish-metallic fascia at base, continued along inner margin to $\frac{1}{5}$, then semicircularly up to disc, very finely attenuated at extremity; a small blackish dot slightly beyond extremity of fascia; a few spots of blackish on costa between base and middle; a very broad blackish irregular blotch, suffusedly covered with bluish metallic scales (appearing raised), anterior edge very irregular, suffusedly broadly edged with pale ochreous-orange, from $\frac{2}{5}$ costa to beyond middle of inner margin; posterior edge irregular, from $\frac{4}{5}$ costa to hindmargin above anal angle, with a strong cuneiform spot of ground colour above middle; anterior to this spot are two bluish leaden spots, ground colour between fascia and hindmargin tinged with ochreous; a small blackish spot on costa near apex; a suffused blackish line around apex and hindmargin: cilia blackish (imperfect). Hindwings dark bronzy-fuscous; 6 and 7 stalked, 3 and 4 from a point, 5 approximated to 4; cilia whitish-fuscous with a fuscous basal line.

rings. Forewings elongate, dilated posteriorly; costa gently arched, hindmargin nearly straight, hardly oblique; deep ferruginous-red, strigulated with dull leaden suffused metallic marks; a deep rich reddish-fuscous somewhat triangular spot just before anal angle, reaching about $\frac{1}{3}$ across wing, edged by a fine line of whitish except on inner margin; space before and beyond somewhat greyish; about three dark fuscous spots arranged in a somewhat curved transverse row, just beyond and above the patch; apex of wing pale reddish-ferruginous, anteriorly edged by a moderately broad suffused oblique dark fuscous fascia from costa at $\frac{5}{6}$ to middle of hindmargin; a fine whitish hindmarginal line: cilia dark fuscous-reddish, becoming lighter and greyish round anal angle. Hindwings with hindmargin somewhat sinuate below apex; greyish-ochreous, strigulated with darker, lighter towards base; cilia greyish with a fuscous median parting line.

Sydney; one specimen without further record.

GELECHIADÆ.

Paltodora tetrachroa, n.sp.

♂. 10 mm.; ♀. 16 mm. Head and thorax ochreous-fuscous, thorax ochreous on sides. Palpi whitish, beneath fuscous on apical half, second joint porrected becoming bristly at apex, terminal joint acute, hardly recurved, nearly erect, internally white. Antennæ fuscous, basal joint elongate, white beneath. Legs ochreous-grey mixed with fuscous, hairs of posterior pair ochreous-tinged. Abdomen fuscous, segmental rings silvery-white, two anterior segments bright yellow, beneath silvery-white. Forewings elongate, moderate, rather narrow, costa nearly straight, apex hardly pointed; 6 out of 8; 7 and 8 stalked; 7 to costa; ochreous-ferruginous, mixed with fuscous, dark fuscous-ferruginous and whitish scales; a narrow median longitudinal dark ferruginous streak, from base to $\frac{1}{3}$, terminating in a small spot of same colour, edged above throughout by a streak of whitish; a small oblique ferruginous mark at end of cell; a smaller similar spot immediately beyond; three or four irregular blackish spots on hindmargin:

cilia greyish-ochreous becoming ochreous round anal angle, with two black lines, basal and terminal, around apex. Hindwings about as broad as forewings; termen sinuate; 3 and 4 remote, 5 nearer 4 than to 6; 6 and 7 stalked, 7 to apex; greyish, darker towards apex; cilia 1½, greyish-ochreous, becoming greyish-fuscous round apical portion.

Broken Hill, N.S.W.; common at light during October.

PALTODORA CYCNOBATHRA, n.sp.

♂. 17 mm. Head and palpi snow-white, palpi externally fuscous. Antennæ fuscous, basal joint white beneath. Thorax white. Patagia white. Abdomen fuscous, segmental margins silvery-white, three anterior segments bright yellow, beneath silvery-white. Legs white mixed with ferruginous, anterior coxæ snow-white, somewhat shining. Forewings elongate, moderate, rather narrow; costa nearly straight, apex hardly pointed; pale fuscous; a somewhat suffused white longitudinal median streak, from base to apex, interrupted by ground colour in middle, attenuated towards apex, and more or less edged on lower portion with fuscous; two or three sharply defined irregular black spots on hindmargin near apex: cilia greyish-ochreous, with two sharply defined dark fuscous lines around apex. Hindwings with hindmargin sinuate beneath apex; cilia greyish-ochreous.

hindmargin and apical fourth of costa: cilia pale greyish-fuscous, becoming whitish on terminal third. Hindwings with hindmargin sinuate beneath apex; greyish; cilia greyish-fuscous, with two indistinct darker lines.

Broken Hill, N.S.W.; two specimens in October.

This species and the two preceding form a closely allied group, each showing differences from one another.

GELECHIA DESMANTHES, n.sp.

♂. 10 mm. Head whitish. Palpi ochreous-whitish, second joint smooth, apex of terminal joint black. Thorax fuscous-whitish. Patagia ochreous-whitish. Antennæ about ¾, fuscous. Abdomen fuscous ringed with whitish, more noticeable beneath. Legs fuscous, banded with whitish. Forewings elongate, moderate, costa nearly straight, apex round-pointed, hindmargin obliquely rounded, 7 and 8 stalked, 7 to costa; dark fuscous; a small spot of ochreous-fuscous at base; three moderate ochreous-white transverse fasciæ; 1st slightly curved and somewhat constricted in middle; from ⅓ of costa to ¼ inner margin, narrowed on inner margin; 2nd moderately straight, from beyond middle of costa to beyond middle of inner margin; 3rd from just before apex to anal angle, broadest on costa and nearly separated above middle by a streak of ground colour: cilia fuscous becoming blackish on lower half of hindmargin and around anal angle, tips round apex whitish-ochreous. Hindwings with termen slightly sinuate; light fuscous, becoming lighter towards base; cilia about 1; fuscous tips lighter.

Broken Hill, N.S.W.; two specimens at light in October.

ŒCOPHORIDÆ.

PALPARIA SIGMASTROPHA, n.sp.

♀. 20 mm. Head and palpi pale fleshy-ochreous. Antennæ ochreous, base whitish, second joint of palpi very short. Legs pale fleshy-ochreous, posterior pair greyish. Thorax fuscous. Abdomen greyish, segmental margins whitish. Forewings el-

gate, moderate, hardly dilated, costa gently arched, apex acute, hardly produced, hindmargin oblique; fleshy-ochreous, mixed with fuscous and whitish; a short whitish streak at base of inner margin; a very oblique blackish streak from costa near base to ⅓ of disc just below middle, becoming blotch-like towards and on costa; ground colour above this streak whitish; a very broad suffused whitish fascia, mixed with minute black strigulæ, except on costal portion, anterior edge from ⅓ of costa to about middle of inner margin, with two sharp angulations outwards, one in middle, large, and one below; posterior edge very suffused from beyond middle of costa to before anal angle, dentate on the upper, caused by a black mark which is continued to near anal angle, thence curved upwards to near middle of hindmargin, forming roughly the letter S, edged posteriorly by its own width of white, except on lower fourth which is filled with pale pinkish gradually shading into ground colour: cilia fleshy-ochreous, mixed with whitish. Hindwings greyish-fuscous, costal edge narrowly white throughout, more pronounced beneath; cilia pinkish-grey.

Kangaroo Island, S.A.; one specimen beaten from *Leptospermum* in November.

EOCHROIS MESODESMA, n.sp.

♂. 20 mm. Head and palpi whitish, second joint somewhat infuscated internally. Legs whitish, somewhat infuscated. An-

cilia white, base and tips fuscous. Hindwings pale greyish-fuscous, lighter towards base; cilia fuscous-whitish, much lighter round anal angle and with a fuscous line near apex.

Leongatha, (?) Victoria; one specimen.

EUPHILTRA EROTICELLA, Meyr., (*E. thermozona*, Turner).—I have seen a specimen of this insect from the collection of Mr. J. A. Kershaw, of Melbourne, which presents somewhat different aspects to the typical specimens. For instance the ground colour is *yellow*, whilst the anterior edge of the second fascia is bright reddish-orange throughout. I at first thought it distinct from *eroticella*, but a careful comparison with typical specimens in my own collection both from Melbourne and Brisbane has convinced me that they are one and the same. The specimen under notice was taken near Melbourne.

PELTOPHORA CALLICHRYSA, n sp.

♂. 13; ♀. 14 mm. Head ochreous, thorax and abdomen dark fuscous. Palpi long, dark fuscous, second joint whitish. Posterior legs ochreous-grey, anterior and middle legs fuscous. Antennæ fuscous, somewhat annulated with white, ciliations nearly 5. Forewings moderate, costa gently arched, apex somewhat pointed; hindmargin sinuate beneath apex, thence oblique; ochreous-whitish, with dark fuscous markings; a narrow basal fascia continued shortly along costa; a very broad fascia moderately straight, edge irregular, from middle of costa to middle of inner margin, occupying median third of wing; a similar somewhat narrower fascia from costa at ¾ to anal angle, narrowed towards anal angle and narrowly continued along costa to apex; a well-marked double discal dot between the two fasciæ; a fine hind-marginal line: cilia dark fuscous. Hindwings bright orange; a moderate fuscous apical patch; cilia dark fuscous.

Sale, Victoria; two specimens (Coll. Lyell) in January.

The description of *theorica*, Meyr., (which Mr. Meyrick has transferred to the genus *Philobota*), approaches this closely; in fact on seeing the ♀ I at first considered it that species. The

[illegible]

Note on the occurrence of *Isoscelis Westwood*, Esq., in Broken Hill, N.S.W.

During the last twelve months certain species of Isoscelis have been abundant at the electric light at this town, whilst at the previous three years scarcely anything [illegible]. As is the habit of this group of insects it was common, and the sexes paired on most evenings with collectors in Australia. The two specimens I believe were taken on the mother. Mr. Horace Lower in [illegible] specimens of *Isoscelis*. Since that date I have seen specimens from near Adelaide, Brisbane and Hobart, Tasmania. So far as I know I was the first to record it from Tasmania. Victoria, or W. Australia and the present is I believe the first occasion it has been recorded from New South Wales. Specimens in Entomological [illegible]

may be looked for in June and July." It will be thus seen that its occurrence in Australia is not mentioned. I believe Mr. W. H. Miskin (Trans. Roy. Soc. Queensland, Vol. viii. Pt. i.) was the first Australian entomologist to record its occurrence in Australia. I am quite aware that the insect under notice is considered by some of my friends as distinct from *D. Livornica*. The late Henry Edwards was of that opinion until I showed him specimens from Africa and Europe, when he acknowledged his error. The series I have before me, numbering nearly 100 specimens, show slight individual differences but not sufficient to warrant a new specific name being given to any one of them.

DESCRIPTION OF A NEW AUSTRALIAN GRASS.

By Fred. Turner, F.L.S., F.R.H.S., etc.

Panicum tulcumbense, sp.nov.

Stems perennial, from a rather prominent, knotty base, attaining a height of two or more feet, glabrous except for a few remote, small tubercles surmounted with short, fine hairs. Leaves ample, from three to eight inches long, about four lines broad, flat and tapering into long, fine points. Panicle from seven to eleven, or rarely more, inches long, on rather long peduncles, loose, narrow, pendulous, with alternate, distant, primary, filiform branches, the lower ones about six inches or more long, the upper ones shorter. The lower secondary branches from one inch to three inches long, but variable. Spikelets rather crowded on the ultimate branches and on the upper portion of the panicle, all pedicellate and about one and one-half lines long. Outer glume about one-third the length of the spikelet, broad, acute, five-nerved; second glume broad, shortly acuminate, with seven to nine prominent nerves; third glume the longest, more acuminate, with five prominent nerves, enclosing a male flower with a large, acute palea. Fruiting glume about half the length of the spikelet, very shortly acuminate, shining, with five, very fine nerves.

ON THE AFFINITIES AND HABITS OF *THYLACOLEO.*

By R. Broom, M.D., B.Sc.

The nature of few fossil animals has been more discussed than that of the remarkable extinct Australian form to which Owen gave the name of *Thylacoleo carnifex.* Not only has there been considerable difference of opinion as to the affinities of the animal, but its probable habits have been even more debated.

The first important paper on *Thylacoleo* was published by Owen in 1859.* In this paper are described the greater part of the posterior half of the skull, a fragment of the maxilla, and the main part of the ramus of the lower jaw. From the examination of the foramina at the base of the skull, together with one or two other characters, Owen was led to conclude that the remains were those of a Marsupial, while from the characters of the temporal fossæ, occiput, and especially from the rudimentary condition of the molars, together with the enormously large and cutting premolars, which bore a considerable superficial resemblance to those of the cat tribe, he was further led to the conclusion that the form had been a carnivore, and "one of the fellest and most destructive of predatory beasts."† His views of its affinities at this time probably were that it had its nearest relatives in the *Dasyuridæ*, bearing apparently a somewhat similar relationship to the existing carnivorous forms that the lion does to the dog. At this time there was no evidence as to whether the large tooth in the front of the jaw, indicated only by the socket, was a canine

* On the Fossil Mammals of Australia. Part i. Description of a mutilated Skull of a large Marsupial Carnivore (*Thylacoleo carnifex*, Owen) from a calcareous conglomerate stratum, eighty miles S.W. of Melbourne, Vic. Phil. Trans. Vol. 149, 1859.

† *Loc. cit.* p. 319.

or a terminal incisor, and though Owen inclined to regard it as a canine, he admits the possibility of its being an incisor, in which case he recognised that the affinities would be more with the Diprotodonts, for he adds:—"If, however, this be really the foremost tooth of the jaw it would be one of a pair of terminal incisors according to the marsupial type exhibited by the *Macropodidæ* and the *Phalangistidæ*."*

In 1866, through receiving further material from Australia, Owen† was enabled to describe the greater part of the skull and of the lower jaw, and to indicate fully the nature of the dentition. It was now clearly shown that the large anterior teeth were incisors which in Owen's opinion "proved the *Thylacoleo* to be the carnivorous modification of the more common and characteristic type of Australian Marsupials, having the incisors of the lower jaw reduced to a pair of large, more or less procumbent and approximate, conical teeth or 'tusks.'"‡ Not only did the additional evidence confirm him in his opinion that *Thylacoleo* was a carnivore, but he considers that in this extinct form we have "the simplest and most effective dental machinery for predatory life and carnivorous diet known in the Mammalian class. It is the extreme modification, to this end, of the Diprotodont type of Marsupialia."§ Beyond admitting its affinities with the Diprotodonts he does not seem to have regarded it as a near relative of any of the existing groups. But from his statements

Australian Marsupial, *Thylacoleo carnifex*, Owen."* In this paper, while agreeing with Owen's opinion that *Thylacoleo* is more nearly allied to the Diprotodonts than to the existing carnivorous forms, he altogether differs from Owen's conclusion that the animal was a carnivore. While the large premolar had struck Owen as being closely paralleled by the last premolar in the lion, Flower is more impressed by its resemblance to the homologous tooth in the Rat-kangaroo. The latter author considers that it can be "easily shown" "that the resemblance of the great premolar of *Thylacoleo* to the 'carnassial' of the true Carnivora is merely superficial."† "Indeed," he adds, "there is no tooth, either in the upper or lower jaw, of any of the Thylacines, Dasyures, or Opossums, that can be with any reason compared with them [the teeth of *Thylacoleo*]. When, however, we pass to another group of the same sub-class, the Hypsiprymni or Rat-kangaroos, we see at once in the great cutting premolar a miniature of that of *Thylacoleo*."‡ In support of this view he points out the main features of the tooth in the Rat-kangaroos and the marked degree of variability. He then considers the other teeth, and concludes that "in the number and arrangement of these teeth . . . *Thylacoleo* corresponds exactly with the modern families *Macropodidæ* and *Phalangistidæ*, and differs completely from the carnivorous marsupials."§ The remarkable reduction of the true molars, he considers, "is evidently in relation with the excessive development of the great trenchant premolar,"‖ and he points out that there is a tendency to reduction of the true molars in the Rat-kangaroos. The small size of the brain cavity and the great development of the temporal ridges he considers to be "probably only a difference of the kind always

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* Q.J.G.S. 1868, p. 307.

† *Loc. cit.* p. 309.

‡ *Loc. cit.* p. 310.

§ *Loc. cit.* p. 311.

‖ *Loc. cit.* p. 311.

observable in comparing large with small species of a natural group."* Having dealt with its affinities, Flower proceeds to consider the probable habits of this animal which Owen had supposed to be a sort of pouched-lion. Towards the solution of this question he propounds the following proposition which he thinks will be generally accepted:—"That if all the known species of a large group of animals with teeth formed on one peculiar type lead lives peaceable and inoffensive to their neighbours, and feed mainly on vegetable substances, the probabilities, in the case of any newly discovered species having teeth constructed on the same general type, are greatly in favour of its having possessed similar habits and been nourished by a corresponding diet."† Assuming this proposition to be correct, he has no difficulty, after having settled its affinities, in concluding that *Thylacoleo* was a vegetable feeder, and he considers that there is no reason why the large premolar should not have been "as well adapted for chopping up succulent roots and vegetables as for dividing the nutritive fibres of animal prey."‡ He also states the food of *Thylacoleo* "may have been some kind of root or bulb; it may have been fruit; it may have been flesh" §; but he does not consider that the organisation of the animal suited it for preying on the large Diprotodonts.

Some years before the publication of Flower's paper, Falconer,‖ in dealing with the probable habits of *Plagiaulax* which Owen

Gerard Krefft,* formerly Curator of the Australian Museum, Sydney, published in the same year as Flower dealt with this subject, a short note in the Annals and Magazine of Natural History, in which he states his belief that *Thylacoleo* was "not much more carnivorous than the Phalangers of the present time."†

To his various opponents Owen‡ replied in a lengthy paper in the Philosophical Transactions for 1871. Flower and Falconer both found their conclusions largely on the fact that a diprotodont dentition is among living Marsupials and in most Eutheria met with only in herbivorous forms; Owen's position on the other hand is mainly founded on Cuvier's principle that the molar teeth always indicate whether an animal has been herbivorous or carnivorous, and he holds that in the teeth of *Thylacoleo* we have "no molar machinery for the mastication of vegetable food, but a maximised modification of the teeth for the division of fleshy fibre, and so much of the tubercular form added for the final crush or squeeze of gristle or other tough part escaping the shears, as exists in the most carnivorous of placental mammals."§ With the view that *Thylacoleo* was a pure carnivore, he holds that all the other parts of the dental set are in complete harmony—the sharp incisors being here constructed "to pierce, retain, and kill," and thus performing the functions of the more usual canines. That a diprotodont dentition can be modified to suit the requirements of a carnivorous animal Owen brings forward quite a series of forms to show. The low position of the condyle and its shape are, he holds, additional evidences in favour of carnivority. Having discussed the various arguments in favour of *Thylacoleo* being a herbivore, he proceeds to deal with the affinities of the form and concludes that it is moderately

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* "On the Dentition of *Thylacoleo carnifex*." Ann. & Mag. Nat. Hist. 1866, (3), xviii. p. 148.

† *Loc. cit.* p. 149.

‡ On the Fossil Mammals of Australia. Part iv. Dentition and Mandible of *Thylacoleo carnifex*, with remarks on the arguments for its Herbivority. Phil. Trans. Vol. 161, 1871, p. 213.

§ *Loc. cit.* p. 228.

nearly allied to *Plagiaulax* and considerably removed from existing Diprotodonts.

In 1872 Krefft* communicated a second short paper to the Annals & Magazine of Natural History, in which he agrees in the main with Flower's position. In this paper he records his opinion "that the animal under discussion is a mixed feeder allied to the phalanger tribe."† But he appears to have been slightly in doubt as to the habits, for he states that "with the true molars reduced to a pair below, one of which is tubercular, and to a single transverse tooth above, the somewhat carnivorous character of the animal becomes manifest;"‡ while further on in the same paper he speaks of *Thylacoleo* as a "certainly harmless creature,"§ and in a paper published a year later,‖ he says,—"the view I took first of the herbivorous habits of the 'lion in phalanger hide' was a perfectly correct one."¶

Since then, beyond a short paper by Owen** in 1887, in which he describes the posterior part of a perfect jaw, I am not aware of

Edition of the Encyclopædia Britannica, 1883, shows that he still maintains his early opinion. And in more recent times Flower's position has received the support of one of our most distinguished palæontologists, Mr. R. Lydekker.*

Whatever difference of opinion may still exist as to the habits of *Thylacoleo* from what is now known of its structure, its affinities can be made out with tolerable certainty. The structure of the lower jaw and the dentition render it manifest that the form is more nearly related to the Phalangers than to any other living group, and there are none of the cranial characters but are quite in harmony with this conclusion. In none of the living Phalangers is there a similar enlargement of the posterior premolar, but in the *Macropodidæ* which have manifestly been an offshoot from the Phalangers, the enlarged premolar has been retained in many of the forms—especially the smaller Rat-kangaroos. About three years ago I discovered in a bone breccia deposit near the Wombeyan Caves, N.S.W., the remains of an interesting little Marsupial, which I described in a paper communicated to this Society,† under the name of *Burramys parvus*. This little form, which is evidently the representative of a sub-family of the *Phalangeridæ*, and to which the name *Burramyinæ* may be given, in most of its characters agrees with the Phalangers, but it possesses the greatly enlarged and grooved premolars of the Rat-kangaroos; and it will be observed that not only does it show the evidence of a group which fills the only remaining gap between the Kangaroos and the Phalangers, but as a Phalanger with the posterior premolars enormously enlarged it comes nearer to *Thylacoleo* than does any extinct or living form hitherto discovered.

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* Manual of Palæontology by Nicholson & Lydekker, Vol. ii, 1889. Also Royal Natural History, Vol. iii. 1894, p. 264.

† "On a small fossil (Diprotodont) Marsupial, with large grooved Premolars." P.L.S.N.S.W. 1895, p. 563. Also "Report on a Bone Breccia Deposit near the Wombeyan Caves, N.S.W.; with Descriptions of some new fossil Marsupials." P.L.S.N.S.W. 1896, p. 48.

Before, however, discussing the relations and habits of *Thylacoleo* it may be well to make a short digression to consider the origin and probable phylogenetic history of the enlarged premolar as found in *Burramys* and carried on into the *Macropodidæ*. Though grooved premolars occur in the *Plagiaulacidæ* it will be unnecessary at present to discuss that group, as it is certainly not nearly related to the existing Diprotodont Marsupials, and any similar development can only have been due to a parallel development.

Let us imagine a small Dromicia-like Phalanger which, from necessity, had to live less exclusively on succulent leaves and other soft substances and had to make up the deficiency with grass. Eucalyptus and other succulent leaves, fruits, and even insects, can be broken and crushed, but grass requires to be cut, and the comparatively feeble and pointed incisors would unaided be unable satisfactorily to finely cut the tougher fibres of the new diet. The sharp-edged premolars would be called in to assist in the dividing process and the increased work given to them would lead to their greater development. It is further not difficult to see the advantage that would result from a serrated edge being acquired, though the exact details by which the serrations would arise could not well, with the meagreness of the data, be more than roughly guessed at. Such a development and specialisation

Dendrolagus, cannot regain the lost "thumb," and are at most slightly modified Wallabies. All the known Rat-kangaroos—which are, there is little doubt, the more primitive members of the group*—are of small size, and their dentition is invariably suited to a fibrous vegetable diet, principally of grass. Though in *Burramys* there are but three molars above, and the fourth below rudimentary, there can be no doubt that in closely related forms the normal number was present, and the changes which would be required to give rise to such a dentition as is met with in the Rat-kangaroos from a Burramys-like ancestor are very slight. The increased grinding work entailed by the tougher vegetable diet would lead to the retention and greater development of the four molars; and while the large cutting premolars would be also retained and modified slightly to suit the special requirements of the various species, the rudimentary premolars being functionless would become lost. In the further development of the *Macropodidæ* which gave rise to the Kangaroos and Wallabies a most interesting change has taken place. Owing to the increase in size of the forms and also to the loose mode of attachment of the jaws to each other, the cutting functions can all be performed by the incisors, and the large premolars which had been functional in the lower forms became much reduced in size, and in the larger species are of so little importance that they are lost shortly after the animal becomes adult without apparently causing any inconvenience. It will thus be seen that there are fairly good reasons for believing that the unusually large development of the last premolar has been brought about in connection with the more

* The position of *Triclis*, De Vis, is uncertain. Lydekker says of it (Palæontology by Nicholson & Lydekker, Vol. ii. p. 1286), "there is a minute tooth behind the lower incisor corresponding to the tooth in the *Phalangeridæ*, commonly reckoned as the representative of the canine [2nd incisor—Thomas]." If this observation be correct it is certainly an interesting Phalangeroid character, but De Vis informs me that the dentition in the adult jaw is "I^1; C^0; P^4; $M^{1, 2, 3, 4}$." It will thus for the present be safer to omit consideration of this form.

fibrous vegetable diet partaken of by those descendants from the Phalangers which had more or less abandoned an arboreal life.

Before considering the relations of *Thylacoleo* to this line of forms with the enlarged premolars it will be necessary to look at the much discussed question of the habits of the animal. Owen has pointed out that in the large sharp-pointed incisors, together with the powerful cutting premolars, we have a dental machinery very similar to that found in the cat tribe—the large incisors taking the place of the carnivore canines—"to pierce, retain and kill"; and that such a dental machinery, though well adapted for a carnivorous diet, would be quite unsuitable for any other; and he has further shown that the structure of the jaw and the cranium confirms the conclusion arrived at from a consideration of the dentition. The main argument of Falconer, Flower, Krefft, and Lydekker on the other hand in favour of *Thylacoleo* being a herbivorous form is that practically all known Diprotodont Marsupials are herbivorous, or mainly herbivorous, and that as *Thylacoleo* is a Diprotodont it most probably likewise had mainly a vegetable diet. That this does not unfairly represent the position will be seen from the proposition of Flower's already quoted, and from the following extract from Lydekker*:—"In originally describing this remarkable animal from fragments of jaws containing the fourth premolar, Sir Richard Owen came to the conclusion that

position, for even in his very first paper he admits the possibility of *Thylacoleo* being allied to the Phalangers, and when more perfect specimens were discovered which proved it to be so, it in no way altered his opinion that *Thylacoleo* was nevertheless a carnivorous animal.

Let us consider, however, whether there is really such a great improbability, as Falconer and Flower seem to think, in a Diprotodont Marsupial becoming a carnivore, that *Thylacoleo* may with such confidence be referred to the vegetable feeders. The question divides itself into two—(1) whether the diprotodont dentition can be modified to suit a carnivorous diet, and (2) whether in a group of animals in a which a certain type of dentition is universal and the habits apparently uniform, an aberrant form may be met with which puts the same type of dentition to quite a different use.

Though Falconer and Flower have inclined to the view that a carnivorous animal to be able satisfactorily to kill its prey requires canines separated by a row of incisors, the large series of forms given by Owen which are carnivorous and yet have the functions of the canines entirely performed by large incisors sufficiently answers the first question. Flower, however, qualifies his statement by defining a "true predaceous carnivorous animal" as "one which kills and eats creatures at all comparable to itself in bulk and capable of making any effectual resistance."* Were this to be accepted as the definition of a carnivorous animal it would rather complicate matters, for the fish-eating Seals would have to be excluded, and so also would many of our most typical carnivores which habitually feed on small forms. There is no doubt that Owen is right in regarding the Hedgehog as more or less a carnivorous form whose organisation is sufficiently adapted to enable it to kill and eat young rabbits, and if we can thus have a diprotodont dentition which can be satisfactorily used in the killing and eating of small animals all our knowledge of the working of Nature would lead us to believe that she could in an

* *Loc. cit.* p. 317.

animal which had become exclusively carnivorous perfect the same type of dentition for an exclusively carnivorous diet.

The second question arises out of Flower's proposition already quoted. In considering it there is one important fact that must not be overlooked, namely, that while among large herbivorous animals many parts of the organisation become so highly specialised to suit the vegetable diet that it would be impossible for the animal to alter its diet very materially and thrive, in small animals the specialisation is much less marked, and a considerable variety of diet is possible. Thus, while it would be impossible for an ox or a kangaroo to become a carnivorous animal, many of the smaller Rodents and some of the small Phalangers which are normally herbivorous occasionally take to eating flesh, and a number of the small Phalangers are partly insectivorous The Bandicoots afford a well known instance of a group of animals which are partly herbivorous and partly insectivorous; and among the Insectivora other instances occur. *Macroscelides*, the Elephant-shrew, has a jaw which judging by analogy would certainly be referred to a herbivorous form and the molar teeth would seem to be quite in harmony with this determination, and yet though *Macroscelides* is largely a vegetable feeder I have found in the stomach abundant remains of ants and even of fairly large beetles. But perhaps in no Order is there a more remarkable instance of change of diet than in the Chiroptera. Had *Pte*[redacted]

It is remarkable that the structure of the molars in *Thylacoleo* has been so lightly passed over by those supporting the herbivorous hypothesis. Flower and Lydekker evidently consider that the molars have been reduced through their functions being taken up by the large premolars. But could the large premolars take up the molar function—could they grind? Even those who favour the idea of *Thylacoleo* being a vegetable feeder admit that the premolars were cutting teeth, and the difficulty of imagining a herbivorous animal without grinders is got over by supposing that its food was of a soft or succulent nature. Flower thinks the food "may have been some kind of root or bulb; it may have been fruit," he says, or "it may have been flesh"; while Lydekker, though he believes the main diet to have been of a vegetable nature, thinks it may have included "the smaller mammals, birds and eggs." Though so many alternative diets have been suggested as possible, Flower presumes with Lydekker that *Thylacoleo* was a vegetable feeder, and I take it that neither believes *Thylacoleo* to have been a regular omnivorous animal feeding regularly on succulent roots, fruits, mammals, birds and eggs, but rather that succulent vegetables and fruit formed the staple diet and that animal food was partaken of only exceptionally.

For *Thylacoleo* to have lived on succulent roots and bulbs, the vegetation of the portion of Australia which it inhabited must have been very different in character from that now prevailing; and this is what Flower assumes. Though, however, this is possible, it must be admitted that as yet there is no palæontological evidence of any such radical change in the flora as will parallel that in the fauna.

But there are insuperable difficulties in the way of considering *Thylacoleo* a bulb- or fruit-eater. With its remarkable dentition the animal would be unable to do more than slice its fruits and vegetables even if it could have procured both in abundance, which is so exceedingly improbable. Now, it can hardly be denied that no mammal would be able to digest vegetables,

or fruits swallowed in slices, unless perhaps when the fruits were drop ripe. But apart from the difficulty that fruits are only ripe at one or occasionally at two seasons of the year, unless we are also to assume the very improbable condition of there being no parrots, parrakeets, cockatoos or flying foxes, there would be very little chance of the fruit ever being allowed to become drop ripe. With succulent roots and bulbs the same difficulty arises as with the fruits, that even the most succulent, if we could suppose them digestible in slices, cannot be had in a succulent condition all the year round.

With regard to the suggestion that "small mammals, birds, and eggs" may have formed part of the diet, it depends considerably on what size of birds and mammals is meant, whether such can be regarded as possible. There are no birds in Australia which *Thylacoleo* would have been at all likely to capture, except perhaps the large flightless Emus and Cassowaries, and even if other small flightless sorts existed, which is exceedingly improbable with Thylacines, Sarcophiles and Dasyures prowling about, they could not have been numerous or lasted long; while if the Emus and other allied forms were eaten surely *Thylacoleo* must be regarded as a carnivorous animal. As for mammals, we are fortunately not in ignorance of the smaller sorts that were contemporaries of the *Thylacoleo*, and we find that though many of the species were different the general character of the fauna differed

would lead us, moreover, to believe that there has probably been no great change in the flora.

It is probably, however, unnecessary to discuss further what food *Thylacoleo* could possibly have obtained, when we have, as I hold with Owen, the most satisfactory proof from its anatomical structure as to what food it did obtain. It must be admitted that *Thylacoleo* had enormous temporal muscles, and it is perfectly certain that such muscles would not have been developed unless the animal required them. For what could such powerful muscles be required? Most certainly not for slicing fruits or succulent roots and bulbs, nor would they be required even for the slicing of fleshy fibres. Temporal muscles are chiefly used apparently for closing the jaws more or less forcibly from the open position, while for the more complicated movements of mastication it is the masseter and pterygoid muscles that are chiefly used. Hence in all carnivorous animals the temporals are largely developed and the masseters more feebly, because the killing process requires a very forcible closing of the jaws, and the work to be done by the premolars and molars is comparatively little. In herbivorous animals the conditions are reversed. The jaws are here rarely required to be opened widely or to be closed with any great force, while a very large amount of grinding work has to be done, hence the temporals are rarely much larger than the masseters and often very much smaller. When we look at *Thylacoleo* we find not only the enormous temporals and only moderate masseters, but everything else about the skull seems to be built on carnivorous lines. Owen has shown the wonderful similarity which exists between the molar machinery in *Thylacoleo* and the lion, and it is hard to conceive as possible any other cause giving rise to such a specialisation in *Thylacoleo* than that which led to a similar specialisation in the cat tribe. Another most striking feature is to be seen in the condition of the incisors. Leaving out of consideration the mode of implantation and structure of the teeth—both confirmatory of the carnivorous hypothesis—there is one point which appears to me absolutely conclusive on the subject. Unless Owen's figures are altogether

unreliable, the lower incisors are quite unlike those of the herbivorous Diprotodonts. In such typical forms as the Wombat, the Koala, the Kangaroo, and the Phalanger, though there are different modifications of the arrangement, we have the lower incisors meeting the upper and forming with them an instrument for biting through a moderately tough fibrous tissue, and even in the very small Diprotodonts, so far as I am aware, the lower incisors always meet and work against the upper. But in *Thylacoleo* we have powerful pointed incisors which do not meet, but overlap. Though technically incisors they are not intended to incise, but to pierce and tear. Such powerful pointed and overlapping teeth, though easily explained on the theory that they were intended to kill and tear animal prey, were never surely provided merely to pierce succulent vegetables or ripe fruit. It might of course be argued that the incisors were used as weapons of defence, as apparently are the canines in the Baboon; but against this idea is the objection that the incisors were put to some use which wore them down and blunted them more rapidly than would be the case if they were chiefly used on the rare occasions when the animal had to defend itself, and furthermore were such the case the temporals would not require to be greatly developed.

There is thus, in my opinion, no other conclusion tenable than that *Thylacoleo* was a purely carnivorous animal and one which would be quite able to, and probably did, kill animals as large as

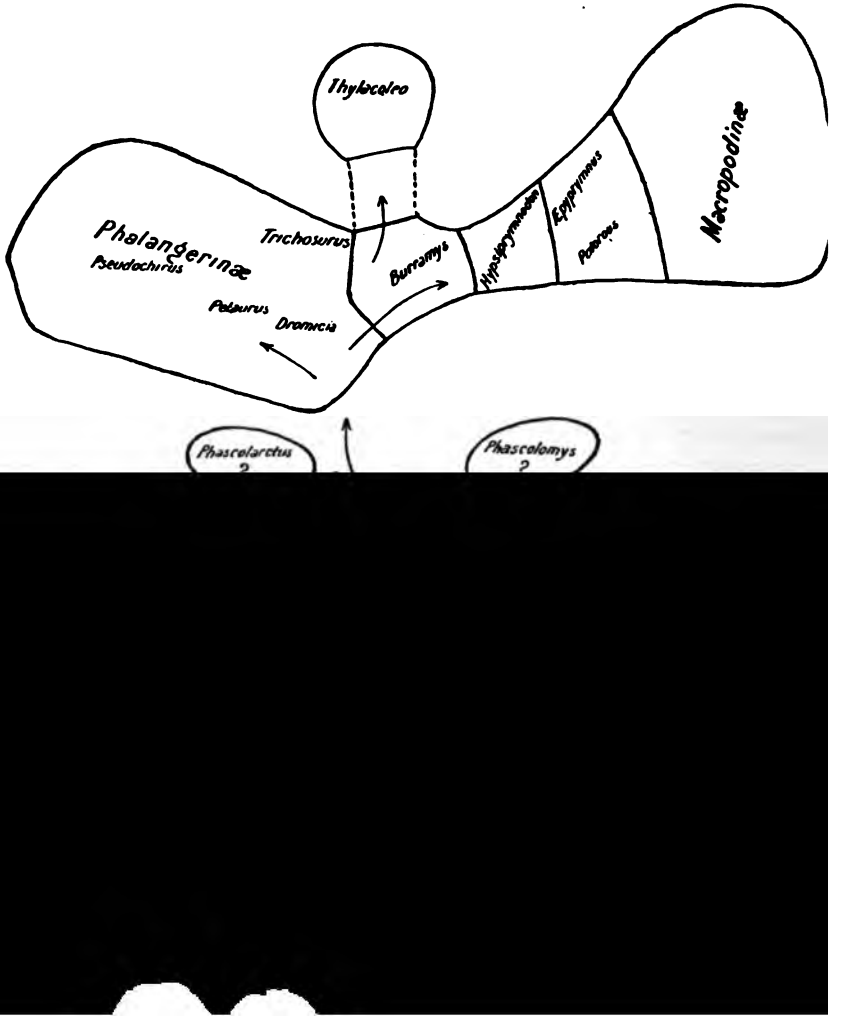
Also in *Burramys* is lost the upper p^1 which is retained in *Thylacoleo*. Still *Burramys* is probably very closely allied to the small Phalanger from which *Thylacoleo* is descended.

As already shown, small mammals which are normally herbivorous very frequently are partly insectivorous, and the type of dentition in *Burramys* is not more typically herbivorous than that in *Macroscelides*. Hence there is reason to suppose that the Burramys-like ancestor of *Thylacoleo* not improbably varied its herbivorous diet by the addition of insects; as we know the living Phalangers most nearly allied to *Burramys* do to a considerable extent. Such a slight modification of the diet would probably afford the starting point for the new line by which *Thylacoleo* arose. From an animal occasionally partaking of insects it is not difficult to derive one more or less habitually insectivorous. In such a form, the following changes would probably be found. The anterior incisors would be strengthened and become less procumbent. The large premolars would probably be but little altered, being as well suited for the new as for the old function, while the molars would become markedly cuspid. The jaw would be shortened and strengthened; and we should have a condition not very dissimilar to that found in the larger Shrews, where a diprotodont type of dentition becomes specialised to an insectivorous life. From such a shrew-like form it would not be difficult to derive a larger animal, which would, like the diprotodont Hedgehog, be more or less carnivorous; and in such a type, as the carnivorous habits became more developed, the characteristic features of *Thylacoleo* would soon arise. The jaw would become gradually more powerful, the temporal muscles greatly enlarged, and the whole face broadened and shortened to bring the piercing teeth nearer the pulling force. The great premolar would become more powerful and more specialised for cutting flesh, while the molars, being but little required, would gradually become reduced.

All that would thus be required to bridge over the gap between the more or less herbivorous *Burramyinæ* and the carnivorous

Thylacoleo would be a group of probably small insectivorous forms.

In the subjoined scheme an endeavour is made to illustrate the probable phylogenetic relationships of the Diprotodont Marsupials. The exact positions of *Phascolarctus* and *Phascolomys* are left as doubtful, and *Cœnolestes* has been omitted, as I consider the evidence which would place it with the Australian Diprotodonts not sufficiently strong, and in any case it is evidently not a near ally of any of the Australian forms.



NOTES AND EXHIBITS.

Mr. Hedley exhibited a specimen of fully developed *Gundlachia* recently taken by Mr. H. Leighton Kesteven from a pool in the Botanical Gardens, Sydney. This is the second instance of its occurrence in Australia, and the first in New South Wales. The genus has been treated of at some length in Vol. viii. (2nd Series) of the Society's Proceedings. Possibly no real *Ancylus* exists in Australia, and all those hitherto reported will ultimately be shown to assume occasionally and at rare intervals the Gundlachia form. Also photographs forwarded by Mr. Alex. Morton, Curator of the Tasmanian Museum, of a gigantic fish-hook almost identical with that described in the last Volume of the Proceedings. The original was collected near Membare in British New Guinea by the surgeon of H.M.S. Wallaroo.

Mr. Froggatt exhibited a series of fruit-flies *(Tephritis tryoni*, Froggatt, the Queensland Fruit-fly, *Halterophora capitata*, Wied., the European Fruit-fly, and *Trypeta* sp.), all of which had been bred out of fruit obtained in the neighbourhood of Sydney. Also samples of apple showing how the San Jose Scale *(Aspidiotus perniciosus*, Comst.) discolours the fruit which it attacks.

Mr. Turner exhibited specimens of three grasses, *Aristida leptopoda*, Benth., (from Liverpool Plains, N.S.W.), *A. behriana*, F.v.M., and *A. ramosa*, R.Br., (from Narromine, New South Wales), the inflorescences of which were affected with parasitic fungi. The first and second of these had not previously been observed in this condition. Some pastoralists are of opinion that these fungoid growths are the cause of certain diseases of stock. Also a specimen of *Atriplex angulata*, Benth., (from Mount Brown, N.S.W.), infested with a species of dodder *(Cuscuta tasmanica*, Engl.), the first time that this pest had been noted on an Australian salt-bush. *C. tasmanica* was not known to be a New

South Wales plant until recorded previously by the exhibitor, who found it growing on the introduced Horehound (*Marrubium vulgare*, Linn.). Also specimens of *Cassia mimosoides*, Linn., and *Crotalaria incana*, Linn., from Alumny Creek, Clarence River, N.S.W., two plants which are suspected of causing red-water in stock.

Mr. Ogilby exhibited the type of the new bathybial fish from Lord Howe Island described in his paper as *Æthoprora perspicillata*, and remarked that it may be distinguished from the three Atlantic species by the presence of a pair of supernumerary photophores between the upper angle of the eye and the anteorbital.

Mr. Brazier exhibited a monstrosity of *Placostylus fibratus*, Martyn, from New Caledonia, the spire of which is drawn out so as to give it the appearance of a *Scala;* it was collected by the late Mr. George Thomas Rossiter and is from his collection. Also a variety (three specimens) of *Risella plana*, Quoy, from Port Jackson, frilled and crenulated at the sutures, 2 mm. wide all round.

WEDNESDAY, MAY 25TH, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, May 25th, 1898.

Mr. Henry Deane, M.A., F.L.S., Vice-President, in the Chair.

Mr. David B. Stead, Denison Street, Camperdown, was elected a Member of the Society.

The Chairman announced that, under the provisions of Rule xxv., the Council had elected Mr. Henry Deane, M.A., F.L.S., Prof. David, B.A., F.G.S., Dr. J. C. Cox, F.L.S., and the Hon. James Norton, LL.D., M.L.C., to be Vice-Presidents; and Mr. Prosper N. Trebeck, J.P., to be Hon. Treasurer for the current year.

DONATIONS.

Zoological Society, London—Abstract 15th March, 5th April 1898. *From the Society.*

Zoologischer Anzeiger. xxi. Band, Nos. 555-556 (March-April, 1898). *From the Editor.*

Société Géologique de Belgique, Liége—Annales. Tome xxi. 2e Liv. (1893-94). *From the Society.*

Museo Nacional de Montevideo—Anales. Nos. i., ii. (pp. 187 271), iii. (1894-95). *From the Museum.*

Russisch-Kaiserliche Mineralogische Gesellschaft zu St. Petersburg—Verhandlungen. xxxv. Band. i. Lief. (1897): Systematisches Sach- und Namen-Register (1885-95). *From the Society.*

Muséum National Hongrois, Budapest—Journal de Zoologie, &c. Vol. xxi. (1898). Parts i.-ii. *From the Museum.*

Department of Agriculture, Sydney—Agricultural Gazette of New South Wales. Vol. ix. Part 4 (April). *From the Hon. the Minister for Mines and Agriculture.*

Royal Society of London—Proceedings. Vol. lxii. Nos. 386-388 (March-April, 1898); Vol. lxiii. No. 389 (April 2nd, 1898): Yearbook, 1896-97 (No. 1). *From the Society.*

Conchological Society of Great Britain and Ireland—Journal of Conchology. Vol. ix. No. 2 (April, 1898). *From the Society.*

Académie Royale des Sciences, &c., de Danemark, Copenhague —Bulletin, 1897. Nr. 6: 1898. Nr. 1. *From the Academy*

La Nuova Notarisia. Serie ix. Aprile, 1898. *From the Editor, Dr. G. B. De Toni*

Société d'Horticulture du Doubs, Besançon-les-Bains—Bulletin. Série illustrée. No. 27 (Mars, 1898). *From the Society.*

Pharmaceutical Journal of Australasia, Sydney. Vol. xi. No.

Johns Hopkins University, Baltimore—University Circulars. Vol. xvii. No. 134 (March, 1898): Hospital Bulletin. Vol. ix. No. 85 (April, 1898). *From the University.*

Société des Sciences de Finlande—Observations Météorologiques faites à Helsingfors en 1896 (1897): Résumé des Années 1881-90 (1897), *From the Society.*

Harvard College, Cambridge, Mass.—Bulletin of the Museum of Comparative Zoology. Vol. xxxi. No. 6 (March, 1898). *From the Director.*

American Museum of Natural History, N.Y.—Bulletin. Vol. x. Articles v.-viii. (pp. 61-158; March-April, 1898). *From the Museum.*

American Naturalist. Vol. xxxii. No. 375 (March, 1898). *From the Editor.*

Société Entomologique de Belgique—Annales. Tome xl. (1896). *From the Society.*

Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique—Annuaire, 1896 et 1897: Bulletins. 3e Série. Tomes xxx-xxxiii. (1895-97): Règlements, 1896. *From the Academy.*

Académie Impériale des Sciences de St. Pétersbourg—Bulletin. ve Série. Tome v. Nos. 3-5 (Oct.-Dec., 1896); T. vi. Nos. 4-5 (Avril-Mai, 1897); T. vii. No. 1 (Juin, 1897). *From the Academy.*

Naturwissenschaftlicher Verein für Schleswig-Holstein, Kiel—Schriften. Band xi. Erstes Heft (Juli, 1897). *From the Society.*

Gesellschaft für Erdkunde zu Berlin—Verhandlungen. Band xxiv. No. 6: Zeitschrift. Band xxxii. No. 3 (1897). *From the Society.*

American Academy of Arts and Sciences, Boston—Proceedings. Vol. xxxii. Nos. 16-17 (June-July, 1897): Vol. xxxiii. Nos. 1-4 (July-August, 1897). *From the Academy.*

California Academy of Sciences, San Francisco—Occasional Papers. No. v. (Sept., 1897): Proceedings. Third Series. *Geology.* Vol. 1, No. 2 (June): *Zoology.* Vol. 1, No. 4 (July, 1897). *From the Academy.*

Cincinnati Society of Natural History—Journal. Vol. xix. No. 3 (Nov., 1897). *From the Society.*

Academy of Natural Sciences, Philadelphia—Proceedings, 1897. Part ii. (April-Sept.). *From the Academy.*

Missouri Botanical Garden, St. Louis—Eighth Annual Report, 1897. *From the Director.*

Bureau of American Ethnology, Washington—Sixteenth Annual Report, 1894-95. By J. W. Powell, Director. *From the Director.*

U.S. Geological Survey, Washington—Seventeenth Annual Report, 1895-96. Parts 1-2 (1896): Bulletins. 87, 127, 130, 135-140 (1896-97): Monographs. xxv.-xxviii (with Atlas) [1895-97]. *From the Director.*

Results of Rain, River and Evaporation Observations made in New South Wales during the Year 1896: Two Pamphlets—Aurora Australis; Icebergs in the Southern Ocean. No. 2 (1897). By H. C. Russell, B.A., C.M.G., F.R.S. *From the Government Astronomer, Sydney.*

Australasian Journal of Pharmacy, Melbourne. Vol. xiii. No. 149 (May, 1898). *From the Editor.*

Société Royale Linnéenne de Bruxelles — Bulletin. 23me. Année. No. 5 (Mars, 1898). *From the Society.*

Perak Government Gazette. Vol. xi. Nos. 9 and 10 (March-April, 1898). *From the Government Secretary.*

Royal Society of Victoria—Proceedings. Vol. x. (New Series). Part ii. (May, 1898). *From the Society.*

Department of Agriculture, Brisbane—Queensland Agricultural Journal. Vol. ii. Part 4 (April, 1898). *From the Secretary for Agriculture.*

Pamphlet—Notes on the Innervation of the Musculus Sternalis, &c. (8vo. Dunedin, 1897). By Professor J. T. Wilson, M.B. *From the Author.*

British Museum (Nat. Hist.)—Catalogue of the Madreporarian Corals. Vol. iii. (4to. London, 1897). By Henry M. Bernard, M.A. *From the Trustees.*

Marine Biological Association, Plymouth—Journal. Vol. v. No. 2 (April, 1898). *From the Director.*

A NEW MYXOMYCETE FOR NEW SOUTH WALES.

By D. McAlpine.

(Communicated by J. H. Maiden.)

On the 2nd of February Mr. J. H. Maiden, Director of the Botanic Gardens, sent me a micro-fungus from a lawn in front of his house which was common on Buffalo-grass *(Stenotaphrum americanum*, Schrank) and Couch-grass *(Cynodon dactylon*, L. C. Rich.); also on *Kyllingia monocephala*, Rottb., a cyperaceous plant. It has since been found on a lawn in the Garden Palace Grounds, but has not been observed in any other localities up to the present. It belongs to the group of Slime-fungi or Myxomycetes and is a novelty for New South Wales, although already recorded for West Australia and Victoria. It is *Physarum cinereum*, Pers., and is commonly found on dead leaves, bark, wood, &c. The grass sent was pretty well covered with very minute roundish or hemispherical cinereous sporangia, which were crowded together, and the wall readily showed the presence of lime on the application of an acid. Many of them were burst and the spore-

generally a brownish tinge in these also and they are very similar to those of *P. cinereum.*"

This question of the colour of the spores is an important one in fungi, because there are some large families such as the *Agaricaceæ* in which the primary divisions are based upon the colour of the spores, and there are some leading systematists who wish to extend this principle to the various divisions of fungi. The difficulty lies in the fact that there is often a combination of colours to which it is almost impossible to give a common name, and in this particular instance there is undoubtedly a brownish tinge associated with the violet, so that one has to select the prevailing tint. In the *Agaricaceæ* already referred to, some authors make one section for black spores (Melanosporæ) and another for purple-black spores (Porphyrosporæ), but I have never yet seen any spores of the former in which there was not a violet tinge, so that too minute distinctions of colour may defeat the very object in view.

The group of Myxomycetes has not yet been much attended to in New South Wales, although it is a very interesting and peculiar one. It is claimed both by botanists and zoologists, because in its reproductive stages it produces distinct spores in a powdery mass, which shows its affinity with fungi, but these spores, instead of producing a mycelium, give rise to swarm-cells, which coalesce to form a plasmodium. So those who pay most attention to the reproductive phase, call this group *Myxomycetes*, while those who consider that the formation of a plasmodium indicates a wide separation from the fungi and links it on to the animal world, speak of it as *Mycetozoa.* About 550 species are known altogether, and of these 52 are recorded for Australia and only 6 for New South Wales. They are here given, with their distribution in other colonies, and named according to Lister's Monograph:—

1. *Arcyria Œrstedtii*, Rost.—New South Wales only. On leaves of *Atherospermum*, Mount Wilson (Hamilton, 1888).

Lister remarks in his Monograph under the heading of this species: "The type specimen of *Hemiarcyria fuliginea*, Cooke

and Mass., from N.S.W., has the capillitium attached to persistent papillose plates of the sporangium-wall, and is similar to the Lyme Regis gatherings of *A. Œrstedtii*, except in the colour, which is now fuliginous-brown."

2. *Badhamia utricularis*, Berk., (*B. varia*, Mass., in part)—Tasmania and Victoria. On wood, &c.
3. *Physarum cinereum*, Pers.—West Australia and Victoria. On Sydney lawns (Maiden, Feb., 1898).
4. *Plasmodiophora brassicæ*, Woron. Victoria and S. Australia. On roots of Crucifers, causing the disease known as "Club-root" or "Fingers and Toes."
5. *Spumaria alba*, DC.—Victoria and Queensland. On grass.
6. *Stemonitis fusca*, Roth.—Victoria, Queensland, Tasmania and West Australia. On dead wood (Maiden, July, 1895).

It will be seen from the above that Mr. Maiden has brought to light no less than two out of the six known New South Wales Myxomycetes, and as he is rapidly enlarging our knowledge of the fungi as well as other botanical products of New South Wales, I have no doubt but this group will soon be abreast of its position in the other colonies.

A PRELIMINARY STUDY OF THE *MEMBRACIDÆ* DESCRIBED FROM AUSTRALIA AND TASMANIA.

By F. W. Goding, M.D., Ph.D.

(Communicated by W. W. Froggatt, F.L.S.)

This paper has been prepared merely to show to the members of the Society what is known of this interesting family of insects, as represented in Australia and Tasmania, and to call attention to the fact that the writer has planned the preparation of a monograph when sufficient material has been examined.

The present paper is based wholly upon the published accounts of these variously formed species, and plainly shows what little attention has been paid to them.

Owing to the deficiency of the published descriptions, some half-dozen forms could not be included in the accompanying synopsis; otherwise it will be found to be accurate. However, the opinion is warranted that *Centrotus suffusa*, Walker, will prove to be a synonym of *Sextius virescens*, Fairmaire, and *Oxyrhachis contorta*, Walker, of *Daunus vitta* of the same author, while the other forms described under *Oxyrhachis* and *Centrotus* will be found to belong to some of the modern genera mentioned, or form types of new genera.

That the monograph may be a credit to the literature of Australian Entomology, I earnestly desire the co-operation of this Society.

Provisional Check-list of the Described *Membracidæ* of Australia and Tasmania.

Genus Acanthucus, Stal.

1. *A. trispiniferus*, Fairm.—*Hab.:* New Holland; Tasmania.
2. *A. gracilispinus*, Stal.—*Hab.:* North Australia.
3. *A. conspercatus*, Stal.—*Hab.:* West Australia.
4. *A. bispinus*, Stal.—*Hab.:* Australia.

Genus SEXTIUS, Stal.

5. *S. virescens*, Fairm.—*Hab.*: New South Wales; **Tasmania.**
6. *S. bipunctatus*, Fabr.—*Hab.*: New Holland.

Genus SERTORIUS, Stal.

7. *S. australis*, Fairm.—*Hab.*: New Holland; **Tasmania.**
8. *S. curvicornis*, Stal.—*Hab.*: Adelaide, Australia.

Genus TERENTIUS, Stal.

9. *T. convexus*, Stal.—*Hab.*: Rockhampton, Australia.

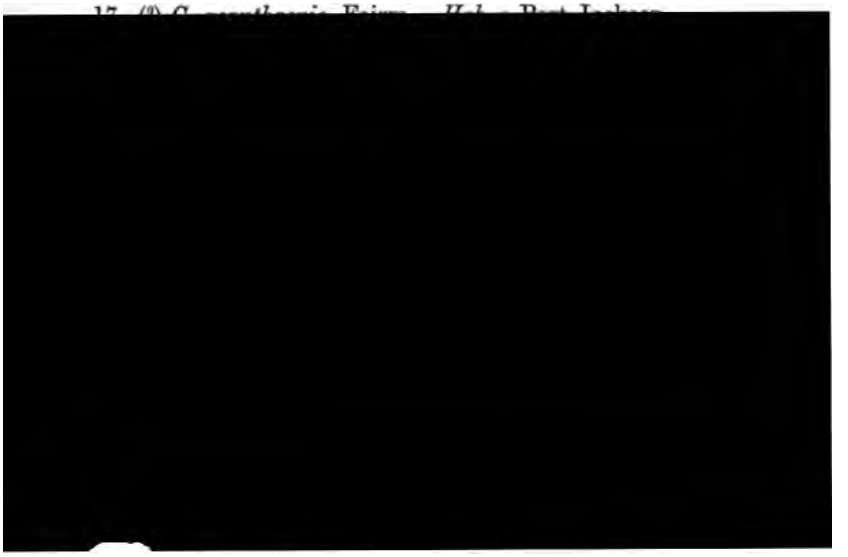
Genus DAUNUS, Stal

10. *D. contractus*, Walk.—*Hab.*: New Holland.
11. *D. falcatus*, Walk.—*Hab.*: Tasmania.
12. *D. vitta*, Walk.—*Hab.*: Tasmania (?).
13. *D. Tasmaniæ*, Fairm.—*Hab.*: New Holland.

Genus (?) OXYRHACHIS, Germ.

14. (?) *O. contorta*, Walk.—*Hab.*: Tasmania.
15. (?) *O. spinicornis*, Walk.—*Hab.*: Moreton Bay.
16. (?) *O. pondifer*, Walk.—*Hab.*: Moreton Bay.

Genus (?) CENTROTUS, Fabr.



2 (3). Prothorax convex, unarmed above lateral angles; posterior process convex anteriorly, tectiform and carinate posteriorly, broad at base, leaving free a very narrow part of the sides of scutellum; costal cell extended a little longthily backward ..... Genus TERENTIUS, Stal.

Pitchy, abdomen and legs yellowish-piceous; sides of chest densely gray, silky; tegmina vitreous, obscure at base, apex and costa dilute-piceous, radial and toward apex of ulnar veins and including veins and discoidal cells, blackish *T. convexus*, Stal.

3 (2). Prothorax horned above lateral angles; costal cell distinctly and very frequently extended far behind radial cell.

4 (7). Lateral horns of prothorax acute or everywhere equally broad, wholly compressed, seen from front, apex not at all broadened.

5 (6). Dorsum of prothorax unarmed in front of posterior process and destitute of a distinctly elevated acute carina..... Genus SERTORIUS, Stal.

a. Lateral horns represented by conical teeth..... S. *australis*, Fairm.

aa. Lateral horns broad, curved, turned upward, posterior angle forming a little prominent tooth..... *S. curvicornis*, Stal.

6 (5). Dorsum of prothorax armed in front of posterior process with an erect, compressed process, or furnished with an acute, distinctly elevated carina..... Genus ACANTHUCUS, Stal.

a. Lateral horns turned directly outward.

b. Dorsum of prothorax furnished with a vertical spine..... *A. trisipiniferus*, Fairm.

bb. Dorsum of prothorax destitute of a vertical spine..... *A. bispinus*, Stal.

aa. Lateral horns not turned directly outward.

c. Lateral horns turned forward and upward; median carina behind lateral angles elevated in an obtuse angle..... *A. conspercatus*, Stal.

cc. Lateral horns turned obliquely outward and upward; dorsal horn long, acute and slender.,... *A. gracilispinus*, Stal.

7 (4). Lateral horns of prothorax strongly turned upward, compressed toward the base, seen from front broadened and truncated toward apex..... ..... Genus DAUNUS, Stal.

a. Lateral horns almost erect, parallel; tegmina not narrow.

b. Brown, golden pubescent; posterior process straight, slender, a little longer than abdomen; tegmina brown, apex clearer..... *D. tasmaniæ*, Fairm.

bb. Piceous pale, yellow pubescent; posterior process lightly undulating along superior surface, tapering to apex, which far surpasses apex of abdomen; tegmina piceous..... *D. contractus*, Walk.

aa. Lateral horns not erect and parallel; tegmina narrow.

c. Piceous, white pubescent; lateral horns almost erect, the tips slightly hooked; tegmina lurid, piceous..... *D. falcatus*, Walk.

cc. Piceous, tawny pubescent; lateral horns a little diverging, inclined a little forward: tegmina piceous,

Descriptions of the Species not included in the Synopsis.

Genus (?) Oryrhachis.

(?) *O. contorta*, Walk.—Long. 7½ mm. Ferruginous-brown, thickly punctured. Prothorax armed with two thick, prismatic, slightly twisted, almost erect horns, which are slightly diverging and inclined forward, two carinæ in front; posterior process curved, very slender, acute at tip, which extends beyond abdomen, with a median carina. Abdomen and legs ferruginous. Tegmina whitish, with a ferruginous discal stripe, and two brown streaks along interior border; veins tawny; wings vitreous. Doubtless this is *Daunus vitta*, Walk. *Hab.*—Tasmania.

(?) *O. spinicornis*, Walk.—♀. Long. corp. 7 mm. Piceous. Prothorax punctured, with two thick, ascending, curved, diverging horns, slightly inclined forward, rudely reticulated toward apex, where they are armed with a spine on the outer side; furnished with a median carina; posterior process forming a spine which extends to apex of tegmina. Chest whitish on each side. Wings cinereous-hyaline, veins piceous. Probably *acanthaspis*, Fairm. *Hab.*—Moreton Bay.

(?) *O. pondifer*, Walk.—♀. Long. corp. 4 mm. Piceous. Prothorax punctured, forming an erect, thick horn, whose summit is much dilated posteriorly, and on each side, where it emits an acute, horizontal spine, with tips fulvous; posterior process gibbous in front, ending in a long, curved spine which has a pale yellow band at its base. Tarsi and tips of tibiæ pale. Tegmina brown, punctured at base and along costa; wings cinereous-hyaline.

Genus (?) Centrotus, Fabr.

(?) *C. acanthucus*, Fairm.—Long. 7 mm. Brown, punctured. Lateral horns of prothorax divergent, compressed, obtuse, broad; posterior process thick at base, notched at scutellum, sinuous beyond, curved inferiorly at apex, bisinuate below, longer than abdomen. Scutellum yellow. Head yellowish, with two glistening black spots above eyes. Tegmina transparent, a little fuliginous. Femora black, tibiæ yellowish. Belongs to the ge

Sertorius, and is synonymous with *decisus*, Walk. *Hab.*—Port Jackson.

(?) *C. rufiventris*, Walk.—♀. Long. corp. 6 mm. Ferruginous, with thin, shining pubescence. Head minutely punctured, bordered, a black spot on each side between eyes and ocelli. Prothorax roughly punctured, inclined backward, a distinct median carina; lateral horns stout, conical, prismatic, diverging, slightly ascending, black toward tips [mutilated in the type]; posterior process slender, armed with two erect, high, compressed, conical, acute bumps, one at base, the other at middle; reaching tip of abdomen. Tegmina pale fulvous, punctured at base. Abdomen bright red, punctured, blackish towards base beneath. Legs ferruginous, femora striped with black. *Hab.*—Moreton Bay.

(?) *C. decisus*, Walk.—♀. Long. corp. 8 mm. Piceous. Prothorax roughly punctured, a slight median carina; lateral horns thick, prismatic, ascending, slightly diverging, conical, tips much rounded; posterior process far passing apex of abdomen, slightly curved, gradually attenuated to apex; sides of scutellum and chest tawny-pubescent. Tegmina lanceolate, piceous and punctured at base, ferruginous at base of costal border, veins ferruginous. Abdomen dark red, piceous at apex. Synonymous with *acanthaspis*, Fairm. *Hab.*—New South Wales.

FURTHER NOTES ON AUSTRALASIAN SHIPWORMS.

By C. Hedley, F.L.S.

The results of studies in the rather neglected branch of Australasian shipworms were published by this Society in Vol. ix. (2nd Series), pp. 465-6 and 501-5, Pl. xxxii. of these Proceedings. Attention having thus been drawn to the subject, Mr. T. Steel exhibited at the meeting of August 28th, 1895, specimens of a fine undescribed species from Fiji, forwarded to him by Mr. T. Ferguson from red gum (?) piles at Nausori Sugar Mill, on the Rewa River. One perfect example of these measured two feet in total length and fifteen millimètres across the valves when in natural apposition, and is therefore probably capable of causing much mischief. Mr. Steel informed the Society that, at the point where these were procured, the river was not only fresh enough to drink, but had been proved at intervals during two years' residence by his own analyses, made in reference to the manufacture of sugar, to be absolutely free from the least saline trace. The timber containing them had been erected for two years. By the kanakas who were employed to obtain these, the animals were greedily devoured raw. Mr. Steel generously presented this specimen to the Australian Museum that it might be reported on by myself. Being reluctant to cut up so superb and unique a specimen I delayed the examination of the species until the arrival of further material. By the good offices of the same kind friend such has now reached me from the Navua River, near the Tamunua Sugar Mill, Fiji, where the stream is somewhat brackish at high tide. Upon these the following account is based.

The present is not the only instance known of a shipworm flourishing in fresh water. Wright has published an interesting account of one, *Nausitoria dunlopei*,* which was proved to pass

* Trans. Linn. Soc. xxiv. 1864, pp. 451-4, Pl. xxiv.

the whole of its existence in perfectly fresh water in the Hurreegonga, an anabranch of the Ganges River, India; and which indeed is unknown elsewhere. Kirk noticed an undetermined species a hundred miles from the sea in the Zambesi River, S. Africa.*

A difficulty which at once confronted me in describing the novelty was to select the genus most appropriate for its reception. The accepted classification is based on the form of the palettes. Continued observation and reflection have persuaded me that these features are not deserving of that classificatory value at which Gould and Wright have estimated them. Their structure and position must expose them, before any other portion of the animal, to stress of modification in change of environment. The soft parts of the anterior trunk should be preferred to the hard in the choice of features to guide the systematist. An examination of published figures and of a considerable series of Australasian specimens shows me that the siphons of the *Teredidæ* are variously divided or united, and vary also in being surrounded or not by a cup-like outgrowth of the mantle. These are the features on which I rely for a clue to the natural division of the family.

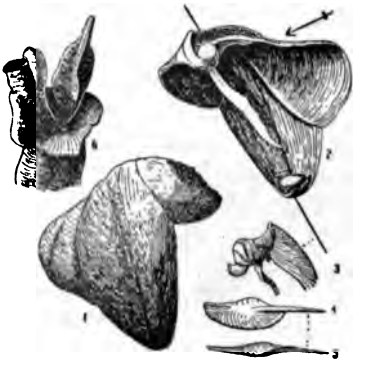
The species under consideration cannot be included in the genus *Teredo* of Linné, for the type of that, according to the figures of Forbes and Hanley† and other writers, entirely lacks the cup-shaped mantle which here surrounds the bases of siphons

described *Calobates*, Gould.* Another genus imperfectly known, but perhaps also to be ranked under *Calobates*, is *Lyrodus*, Gould, type *Teredo chlorotica*, Gould,† "from ships that have cruised in the Pacific."

CALOBATES FLUVIATILIS, n.sp.

(Figs. 1-6.)

For specific identification of the members of the genus *Calobates*, I rely on one part of the valve only,—the anterior section or auricle, of which the interior aspect is the characteristic. This portion of the valve (figs. 1-2) is that which in life is protected from friction by the soft parts, and whose development is not interfered with by the station of the animal. In the present species the anterior dorsal margin is straight and sloping, the anterior edge of the auricle is gently curved and meets the margin of the antero-median area at a wide angle. From the hinge process a spur is seen in profile, viewed from the anterior side, to project (fig. 3). The height of the valve figured is 10 mm, and the length the same. The remainder of the characters correspond to those of *(T.) edax* previously described in these Proceedings. The palettes (figs. 4-5) are usually much worn by friction; a well preserved specimen selected for illustration is 17 mm. in total length, straight and asymmetrical, the blade twice the length of the stalk, on one side the flat blade is hatchet-shaped, on the



* Proc. Boston Soc. Nat. Hist. viii. 1862, p. 283.

† Invertebrata of Massachusets, 1870, p. 34, fig. 360. Tryon considers (Structural and Systematic Conchology, iii. 1884, p. 123) that *Lyrodus* may belong to *Nausitoria*. Indeed it is possible that *chlorotica* may be *saulii*.

reverse it bears a blunt point. In this respect it recalls the "Jedburgh Axe," a weapon of ancient Scottish warfare. The stalks of the palettes are embedded in the muscles of the anterior trunk, one on each side, close to the base of the conjoined siphons. The sketch (fig. 6) shows the mantle-cup ripped open and one palette removed and the other *in situ*. Fragments of the tube before me show no choke of imbricating plates. A piece of eucalypt timber, a foot in length, is riddled with numerous, close, fairly straight burrows, 12 mm. in diameter, lined by thick shelly tubes.

Hab.—Rewa and Navua Rivers, Viti Levu, Fiji.

Type to be preserved in the Australian Museum.

The study of the foregoing novelty induced a review of the information amassed since the publication of my previous article on the subject of Australasian shipworms. Mr. Gerald Halligan has kindly placed at my disposal complete specimens of shipworms found boring wharf piles in Circular Quay and Woolloomooloo Wharf, Sydney. Among these I observe,

CALOBATES SAULII, Wright.

(Figs. 7-9.)

described from Port Phillip, Victoria.* The peculiar palettes (fig. 9) give to this a ready means of recogni-

The valve (figs. 7-8) is distinguished by a broad and deep auricle, truncated anteriorly and curved in to meet the antero-median margin at an acute angle. The example before me measures 7 mm. in height, and in length the same. So far as my experience goes *C. saulii* never approaches the size of *(T) edax*.

The anterior portion of the animal possesses the cup-like process of the mantle like that figured and described for *C. fluviatilis*, and I accordingly transfer it to *Calobates*. Wright has figured the same feature in *Kuphus* (?) *mannii*,* and I therefore follow Tryon† in placing it also in *Calobates*. This character is again apparent in Wright's figures of *Nausitoria dunlopei*,‡ *Calobates australis*,§ and *C. thoracites*.‖

I am much indebted to Prof. Ralph Tate for an opportunity of examining authentic specimens of his *Teredo fragilis*.¶ This has left me no doubt that *T. fragilis* is a synonym of *C. saulii*, to which the unfigured valves quite correspond. The apparent difference in the palettes is due to the fracture of the specimens figured, wherein all joints but the basal one have been snapped off.

Miss Lodder has sent me specimens of *C. saulii* from the entrance of the Tamar River, and Sandford, Tasmania, and Mr. G. B. Pritchard from Beaumaris, Victoria. I have also seen it from the Bellinger River, N.S.W.

Besides *C. saulii*, Mr. G. Halligan's series of Sydney shipworms also embraced examples of *Teredo edax*, Hedley, a species which I now wish to include in *Calobates*, since these entire animals possess the character above emphasised, which appears to me to distinguish the genus.

I have also had brought under my notice valves of *Teredo antarctica*, Hutton, from Port Stephens, N.S.W., a habitat which requires confirmatory evidence. Probably this species should follow others into *Calobates*. In a list of Victorian Mollusca

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* *Op. cit.* xxv. Pl. lxv. f. 5.

† Am. Journ. Conch. iii. 1867, Suppl. p. 19.

‡ *Op. cit.* xxiv. Pl. xlvi. f. 2.

§ *Op. cit.* xxv. Pl. lxiv. f. 1,

‖ *Op. cit.* xxv. Pl. lxiv. f. 7.

¶ Trans. Roy. Soc. S.A. 1888, p. 60, Pl. xi. ff. 13a, 13b, 13c.

recently published by Mrs. Kenyon, the error of ascribing the local shipworm to a European species is again repeated.

At Oubatche, New Caledonia, I was shown by Madame Du Bois, the local postmistress, several tubes of *Kuphus arenarius*, which she informed me had been obtained from the reefs in that neighbourhood. This is an interesting extension of the previously recorded range.

Summary.—The soft parts rather than the hard should be taken as a guide in a classification of the shipworms. A salient character is the cup-like process of the mantle which embraces both siphons and palettes; the siphons differ in the extent to which they are divided.

The genus *Calobates*, Gould, is hereby remodelled and characterised by a cup-like anterior fold of the mantle and short siphons divergent for half their length. It thus embraces Wright's *Nausitoria*, possibly Gould's *Lyrodus*, and species referred to other genera.

A new species, *Calobates fluviatilis*, from Fiji is distinguished by the rounded and produced auricle of the valve, and by the hatchet-shaped palettes.

The shipworms at present recorded from temperate Australia are :—*Calobates australis*, Wright, from Fremantle, W.A. ; *C. saulii*, Wright (to which *Teredo fragilis*, Tate, is reduced), from Adelaide, Melbourne, Launceston, Sydney and the Bellinger River, N.S.W.; *C. edax*, Hedley, from Adelaide and Sydney, and doubtfully *Teredo (? Calobates) antarctica*, Hutton, from Port Stephens, N.S.W.

DESCRIPTIONS OF NEW MOLLUSCA, CHIEFLY FROM NEW CALEDONIA.

By C. Hedley, F.L.S.

Placostylus remotus, n.sp.

(Figs. 1-2.)

Shell an elongate cone, narrow in proportion to length, thick and strong, anteriorly broad and blunt, posteriorly tapering slowly, scarcely perforate. Colour pale ochre, with a darker broad peripheral band, which is edged above and below with a pale border, and a narrow, dull white margin below the suture. Whorls six, rounded, apex blunt, nepionic shell a whorl and a half. Suture impressed. Sculpture;—everywhere irregularly crossed by oblique growth lines, both fine and coarse, which interrupt and distort a series of minute, numerous, irregular, spiral scratches which are not to be perceived without a lens (fig. 2). Aperture oblique, rudely hexagonal, subchannelled anteriorly. Columella thickened, externally folded over a narrow umbilical chink, internally sharply bent, the upper limb a flat, deeply entering and obliquely ascending plate, the lower swelling into a slight but distinct tubercle. Outer lip internally much thickened, but neither thickened nor reflected externally, forming a sharp angle at the insertion. A thin callus is spread on the body whorl. In the specimen described the anterior corner of the aperture is externally surrounded by a series of imbricating lamellae; this may, however, be an individual feature or repair of breakage. Length 26, breadth 12 mm.

Hab.—The Mambare Goldfield, Brit. N. Guinea.

Type.—In the collection of Dr. J. C. Cox.

This species is represented to me by a single well-preserved specimen. Dr. Cox, having purchased a collection of land shells from a digger returned from New Guinea, found it jammed in the aperture of a large *Rhysota hercules*.

It is the smallest known *Placostylus*, and is remarkable besides for its narrow shape, blunt anterior extremity and peculiar aperture. Indeed it has a better claim to subgeneric distinction than have some proposed divisions of the genus. One of the chief claims it has on our attention is the extension of the geographical range which it brings to the genus.

In a paper read before this Society some years ago I pointed to *Placostylus* as illustrative of the antiquity, separation from outside and faunal unity within, of the larger islands of the South-West Pacific, deducing that New Zealand was an ultimate link thereof, that her fauna was thence derived, and "that this Melanesian plateau was never connected with, nor populated from Australia, probably its fauna was derived from Papua *via* New Britain."*

I am now disposed to regard *Placostylus* as an extremely ancient group of Antarctic origin, and consider that the present species strayed northwestwards by a now broken land route when *Papuina*, the land operculates and numerous other forms, passed from New Guinea, through New Britain and New Ireland into the Solomons.

The first writer, so far as my reading has served me, to recog-

in the Post-Pliocene alluvium of King's Creek, Darling Downs.* I have myself no doubt that this is an error. Firstly, such an occurrence would be utterly at variance with the remainder of the fossils and with the recent fauna. Secondly, *Placostylus* is essentially gregarious, where it occurs at all there it occurs abundantly, if it had really existed in Queensland it would have recurred to subsequent collectors. While serving on the scientific staff of the Queensland Museum I enjoyed the opportunity of seeing the largest collection yet unearthed of King's Creek fossils; the agent of the Museum was expressly directed to search for mollusca. All that were obtained passed through my hands officially, yet I saw nothing of *Placostylus*. Thirdly, had *Placostylus* really occurred in Australia it is unlikely that it should occur as a species not distinguishable, as Harris says, from the New Zealand form. In short, the Queensland *Placostylus* had best be banished to join the company of Owen's Australian Elephant, Ettingshausen's Australian Oaks, Filhol's New Caledonian Rhinoceros, and Owen's Gigantic Lord Howe Lizard.

In the above-quoted paper I drew attention to the probability that the Fijian fauna was derived from the Solomons, a theory which had not, I believe, been advanced before. In addition to the evidence there cited of the *Placostylus*, I have since collected other interesting testimony in support of this view.

Treating of the geology of Rotuma, Mr. J. S. Gardiner† points out that, whereas in the antiquated charts of the Challenger Reports, Fiji is shown united in a submarine plateau to the Tongan, Ellice, and Samoan Groups, modern surveys have demonstrated that the two latter are separated from each and the others by abyssal gulfs deeper than 2,200 fathoms. Recent soundings have developed a plateau of a depth not greater than 1,500 fathoms in a general depth of from 2,000 to 3,000 fathoms, including Tonga and Fiji, and extending westwards to Santa

* Jack & Etheridge, Geology & Palæontology of Queensland and New Guinea, 1892, p. 646. Harris, Catalogue Tertiary Mollusca of the British Museum, 1897, p. 4.

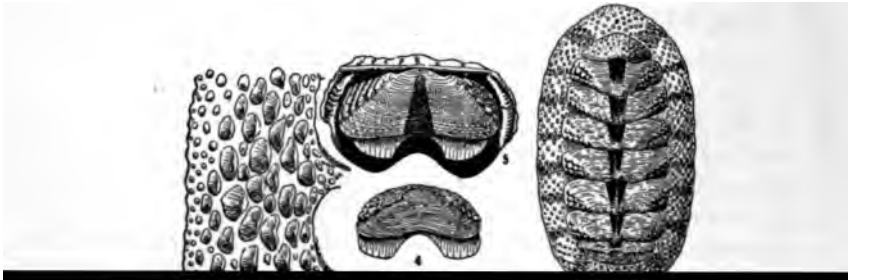
† Quart. Journ. Geol. Soc. liv. 1898, p. 2.

Cruz and the Solomons. Mr. W. B. Hemsley has described a remarkable Sapotaceous genus *Chelonespermum*, of which two of the known species are from the Solomons and the third from Fiji.* It is remarkable how strictly *Nautilus* observes as its eastern limit the ancient coast line of the Melanesian plateau. At a recent meeting of this Society† Mr. E. R. Waite exhibited examples from Fiji of *Typhlops aluensis*, Blgr., a species previously known only from the Solomon Islands.

ISCHNOCHITON ARAUCARIANUS, n.sp.

(Figs. 3-6.)

Shell oval, depressed, valves rounded posteriorly, but the anterior ones more pointed. Colour greenish-grey, each valve shading posteriorly into cream, with a median wedge of black, which is sometimes split with a central white stripe. Interior



minute grains. Scales of girdle radiately furrowed, somewhat apart, large and small intermingled, with a series of very small next the valves and along the margin. Gills extending along five-sixths of the foot. Length 38, breadth 22 mm.

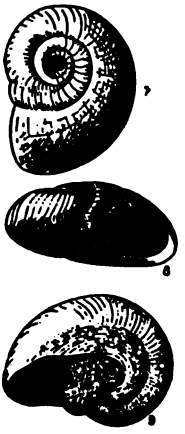
Hab.—The Isle of Pines, New Caledonia.

Type.—To be placed in the Australian Museum.

I found this species in abundance between half and high tide marks in a rock pool, about half a mile distant from the Commandant's House at the Isle of Pines, New Caledonia, in October, 1897. This island was so called by Captain Cook from its forest of *Araucaria cookii*, which then, as now, gives so quaint a charm to the landscape, and from which I have derived a specific name.

Clinging to the rocks beside it was *Acanthopleura spiniger*, and the *Littorina*, *Nerita* and *Ricinula* characteristic of the rocky shore of the Pacific tropics kept them company.

The arrangement of large and small scales together on the girdle separate this *Ischnochiton* from all but *I. cariosus*, Carpenter, a native of South Australia and Victoria. From that the novelty differs greatly by broader and flatter valves and by an entirely different scheme both of colour and of sculpture. Technically the shell under consideration should form a second species of Carpenter's subgenus *Heterozona*, based on the uneven girdle scales, but the general aspect of it suggests that such a union would be strained by the remaining features.



TEINOSTOMA OPPLETUM, n.sp.

(Figs. 7-9.)

Shell discoidal, thick, opaque, inner whorls sunk, each whorl margined by a heavy sutural band of callus, which projects at the aperture. Colour white, surface glossy. Sculpture;—indistinct malleations and obscure revolving grooves. Whorls 3½, the spire sunk, last whorl subangled arou the base, broadening and descending rapidly to the apertu

The peculiar feature of the shell is that each whorl is separated from that within it by a thick layer of intercalated callus which arches higher than the vertex of the whorl, and at the finish projects as a knob beyond and beside the aperture. Beneath, the same callus spreads as a pad over the basal axis; so that could the callus be dissolved away the whorls would be seen separate. Aperture oblique, simple, oval; above lip sharp, and straight; basal lip thick, bevelled-edged. Diam. major 2, minor $1\frac{3}{4}$, height 1 mm.

Hab.—Panie, New Caledonia.

Type to be presented to the Australian Museum.

I collected five specimens among shell-sand at high water mark, two of which differ from the type specimen by the spire being raised instead of sunk.

The development of the callus is not always so marked as in the individual figured. From Thursday Island, Torres Straits, I have seen what seems a variation of this species in which the sutural callus is hardly visible.

T. oppletum appears to be a link between *Teinstoma* proper and *Leucorhynchia*.

DIPLOMMATINA OBESA, n.sp.

(Fig. 10.)

Shell minute, sinistral, ovate, stout, narrowly perforate, with

appressed posteriorly, eared on the upper external angle. When viewed in profile a second lip, similar to the first, is discovered immediately behind the aperture proper. Within the aperture is bevelled and contracted in a funnel, a small tubercle is seated deep within the aperture on the right side. Length 1½, breadth ¾ mm.

Hab.—Oubatche, New Caledonia.

Type to be presented to the Australian Museum.

Oubatche is a station on the north-east coast of New Caledonia about 20° 28″ south latitude.* I procured this shell on the slopes of Mount Ignambi, about four miles distant from the house of my kind hosts, Messrs. A. O. and J. Henry, where the road to Ouaco enters the first piece of jungle. Among fallen leaves and dead sticks on stony ground I found the new *Diplommatina* in tolerable abundance, With the novelty was another and a larger *Diplommatina* 2½ mm. long. I am inclined to consider it *D. perroquiniana*, but the account of *D. montrouzieri* answers to it almost as well. In doubt whether it be a distinct species or a link between these two, I refrain from describing it as new, but content myself with presenting a drawing (fig. 11) of this larger Oubatche species.

Fig. 11.

From New Caledonia there are already known three representatives of this genus, all found by one diligent and acute collector in the southern end of the island. They are *D. mariei*, Crosse, (Journ. de Conchyl. xv. 1867, p. 179, Pl. xvi. f. 6); *D. perroquiniana*, Crosse (*op. cit.* xxi. 1873, p. 144, Pl. i. f. 6); and *D. montrouzieri*, Crosse (*op. cit.* xxii. 1874, p. 394, Pl. xii. f. 8). Besides its distant habitat, *D. obesa* is easily separated from these as well as from most known species by its minute size and toothed aperture. This feature is common to such *Diplommatina* as the Papuan *D. symmetrica* and

* For a fuller account, see Ogilby, *ante*, Vol. xxii. p. 762.

the Bornean *D. whiteheadi*, the latter of which presents other analogies.

Associated with the two *Diplommatina* in the forest at Oubatche were *Placostylus caledonicus*, Petit; *Rhytida beraudi*, Gassies; *R. ouveana*, Souverbie; *Microcystis savesi*, Gassies; *Pseudopartula singularis*, Pfeiffer; *Amphicyclotus guestierianus*, Gassies; *Helicina primeana*, Gassies; *Flammulina baladensis*, Souverbie; and *Endodonta confinis*, Gassies.

RISSOINA ANGUSTA, n.sp.

(Fig. 12.)

Shell narrowly conical, tall, slender, with whorls longitudinally ribbed and contracted beneath the suture. Colour uniform golden brown. Whorls seven, of which two are nepionic, the last equalling in length the three previous, slightly rounded; each whorl contracted, the third at midway down, the rest at intervals receding posteriorly, the last at just beneath the suture; sutures sharply sinuate. Sculpture;—no spiral sculpture is visible, the longitudinal is by sharp, strong, perpendicular ribs, slightly arched, suddenly deflected and almost beaded at the above described contraction, continuous from whorl to whorl, faint

860 species, is the fullest local marine molluscan fauna yet enumerated from the tropical South-west Pacific. I was much interested to find, during a few hours' search upon the Panie beach, situated about 120 miles W.N.W. of the Loyalties, several of the species which they mention. These are now first recorded from the mainland, some of the more noteworthy finds being: *Megerlia sanguinea*, Chem.; *Ervillia sandwichensis*, Smith; *Columbella stephensi*, M. & S.; *Marginella elliptica*, Redfield; *Rissoa pyrrhacme*, M. & S.; *Schismope ferriezi*, Crosse, and *S. moreleti*, Crosse; *Barleia chasteri*, M. & S.; *Mangelia rhodacme*, M. & S.; *Caecum exile*, Folin; *Cadulus viviperidens*, M. & S.; *Minolia glaphyrella*, M. & S., which I cannot separate from *M. pudibunda*, Fischer, and *Pyrgulina gliriella*, M. & S., which I have also seen from Thursday Island, Queensland.

EXPLANATION OF FIGURES.

Fig. 1.—*Placostylus remotus*, Hedley.
Fig. 2.—Sculpture of the same, from the body whorl.
Fig. 3.—*Ischnochiton araucarianus*, Hedley.
Fig. 4.—Posterior valve of the same.
Fig. 5.—Intermediate valve of the same, external aspect shown with the internal.
Fig. 6.—Portion of girdle of the same.
Fig. 7.—*Teinostoma oppletum*, Hedley, superior aspect.
Fig. 8.—Peripheral aspect of the same.
Fig. 9.—Basal aspect of the same.
Fig. 10.—*Diplommatina obesa*, Hedley.
Fig. 11.—*Diplommatina* (?) *perroquiniana*, Crosse.
Fig. 12.—*Rissoina angusta*, Hedley.

NOTES AND EXHIBITS.

Mr. Maiden exhibited the Myxomycete (*Physarum cinereum*, Pers.) described in Mr. McAlpine's paper. Also another parasitic fungus, *Cerebella andropogonis*, Cesati, found on *Andropogon pertusus* in New England. This is the first time this fungus has been recorded from New South Wales; the determination was made by Mr. Alex. Grant.

Mr. Maiden also exhibited a series of South African Proteaceæ belonging to the genera *Aulax*, *Leucadendron*, *Protea*, and *Leucospermum*. They are from the northern part of Cape Colony, and were collected in 1896 by Schlechter in his "Iter secundum." Also a specimen of *Brabejum stellatifolium*, Linn., from Cape Colony, received from Professor MacOwen, of Cape Town. This species is particularly interesting to us from the fact that a cultivated plant in the Sydney Botanic Gardens was described by Mueller as *Macadamia verticillata*. (See Bentham & Hooker's *Genera Plantarum*, iii. 178). Also fresh fruits of *Cerbera Odollam*, Gærtn., (*C. Manghu*, Linn.; *C. lactaria*, Ham.) from New Caledonia.

Mr. Edgar R. Waite, referring to some rats he had sent to the

Mr. Fred. Turner forwarded for exhibition a specimen of *Portulaca oleracea*, Linn., infested with Dodder (*Cuscuta australis*, R.Br.), collected on the Grey Range, N.S.W., an association of these species not previously recorded. The exhibitor had also received from the interior two other native plants, *Boerhaavia diffusa*, Linn., and *Alternanthera nodiflora*, R.Br., similarly attacked.

Mr. Palmer exhibited a number of interesting objects from Lawson, Blue Mts., including a living Echidna; a peculiarly marked spider (*Celænia excavata*, Koch), with two egg-bags marked like the fabricator; and specimens of maize showing various abnormal associations of cob and tassel due to the imperfect separation of the sexes.

Mr. Deane exhibited specimens of fossil fruits ascribed to the proteaceous genus *Hakea*, from Central Otago, New Zealand, kindly forwarded by Miss Marchant of Dunedin. A short notice of the discovery and identification of these fruits with other remains, by Mr. G. M. Thomson, will be found in the Transactions of the New Zealand Institute for 1896 (Vol. xxix. p. 628).

WEDNESDAY, 29TH JUNE, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, June 29th, 1898.

Professor J. T. Wilson, M.B., President, in the Chair.

DONATIONS.

Department of Agriculture, Victoria—Additions to the Fungi on the Vine in Australia. By D. McAlpine, assisted by Gerald H. Robinson (8vo., 1897). *From D. McAlpine, Esq.*

University of Melbourne—Examination Papers. Final Honour, &c., February, 1898. *From the Council.*

Société Royale de Botanique de Belgique—Bulletin. Tome xxxvi. (1897). *From the Society.*

Entomological Society, London—Transactions, 1898. Part i. (April, 1898). *From the Society.*

Zoological Society, London—Proceedings, 1897. Part iv. (April): Abstract, 19th April, 3rd and 17th May, 1898. *From the Society.*

Department of Agriculture, Perth, W.A.—Producers' Gazette and Settlers' Record. Vol. v. Part 4. (April, 1898). *From the Secretary.*

Perak Government Gazette. Vol. xi. Nos. 11-14 (April-May). *From the Government Secretary.*

Zoologischer Anzeiger. xxi. Band. Nos. 557-559 (April-May, 1898). *From the Editor.*

Royal Society, London—Proceedings. Vol. lxiii. Nos. 390-395 (April-May, 1898). *From the Society.*

Geological Society, London—Quarterly Journal. Vol. liv. Part 2 (No. 214; May, 1898). *From the Society.*

Royal Physical Society of Edinburgh—Proceedings. Vol. xiii. Part 3 (Session 1896-97). *From the Society.*

Cambridge Philosophical Society—Transactions. Vol. xvi. Part iv. (1898). *From the Society.*

Royal Gardens, Kew—Hooker's Icones Plantarum. Fourth Series. Vol. vi. Part iii. (April, 1898). *From the Bentham Trustees.*

Société Royale des Sciences de Liége—Mémoires. 2e Série. Tome xx. (1898). *From the Society.*

Société d'Horticulture du Doubs, Besançon-les-Bains—Bulletin. Série illustrée. Nos. 28-29 (Avril-Mai, 1898). *From the Society.*

University of Sydney—Calendar for the Year 1898. *From the Senate.*

Field Naturalists' Club of Victoria—Victorian Naturalist. Vol. xv. No. 2 (June, 1898). *From the Club.*

Société Royale Linnéenne de Bruxelles—Bulletin. xxiii.me Année. Nos. 6 (Avril, 1898). *From the Society.*

American Geographical Society, New York—Bulletin. Vol. xxx. No. 2 (1898). *From the Society.*

Museum of Comparative Zoology at Harvard College, Cambridge, Mass.—Bulletin. Vol. xxxii. Nos. 1-2 (April, 1898). *From the Director.*

Société Scientifique du Chili—Actes. Tome vii. 4me Livraison (1897). *From the Society.*

Australian Museum, Sydney—Catalogue No. 4. Australian Birds. Parts 1 and 2. Accipitres and Striges. Second Edition (1898): Records. Vol. iii. No. 4 (June, 1898). *From the Trustees.*

The Surveyor, Sydney. Vol. xi. No. 6 (June, 1898). *From the Editor.*

Royal Society of New South Wales—Abstract of Proceedings. May 4th, and June 1st, 1898. *From the Society.*

Société Royale de Géographie d'Anvers—Bulletin. Tome xxii. 1er Fasc. (1898). *From the Society.*

Comité Géologique, St. Pétersbourg—Bulletin. Vol. xvi. (1897), Nos. 3-9. *From the Society.*

Société Impériale des Naturalistes de Moscou—Bulletin. Année 1897, No. 3. *From the Society.*

Kongliga Svenska Vetenskaps-Akademie—Handlingar. Bd. xxix. (1896-97). *From the Society.*

Department of Agriculture, Brisbane—Queensland Agricultural Journal. Vol. ii. Part 6 (June, 1898). *From the Secretary for Agriculture.*

International Catalogue of Scientific Literature—Report of the Committee of the Royal Society of London (8vo. March 30th, 1898). *From Professor A. Liversidge, M.A., F.R.S.*

Royal Irish Academy, Dublin—Transactions. Vol. xxxi. Parts i.-vi. (Nov. 1896-March, 1898). *From the Academy.*

Société Géologique de Belgique—Annales. Tome xxv. 1re Liv. (Avril, 1898). *From the Society.*

Australasian Journal of Pharmacy. Vol. xiii. No. 150 (June, 1898). *From the Editor.*

Field Naturalists' Club of Geelong—Geelong Naturalist. Vol. vi. No 3 (February, 1898). *From the Club.*

Museo Nacional de Montevideo—Anales. Tomo ii. Fasc. viii. (1898). *From the Director.*

OBSERVATIONS ON THE VEGETATION OF LORD HOWE ISLAND.

By J. H. Maiden, Botanic Gardens, Sydney.

(Plates I.-IV.)

SYNOPSIS OF PAPER.

Introductory Remarks:..... p. 112
Meteorology ..... p. 114
Some Minor Notes ..... p. 115
Bilbiographical Notes ..... p. 116
Dicotyledons ..... p. 123
Monocotyledons..... p. 136
Cryptogams ..... p. 144
List of Timber Trees..... p. 147
Introduced Weeds..... p. 148
Edible Introduced Fruits. ..... p. 151
Vegetables and Miscellaneous Food-crops..... p. 153
Some Miscellaneous Introduced Plants (chiefly economic) p. 154
Some Lord Howe Island Dishes..... p. 155
Summary of Results..... p. 156
Reference to Plates..... p. 157

Introductory Remarks.

after about two hours' hard pulling. The weather continued to increase in violence, so that return to the ship became impossible that day. Next day the weather increased in severity to a gale, and finally, on the afternoon of the 31st March, the "Thetis" broke her anchors and steamed for Sydney, which she reached after a perilous voyage, arriving with bunkers almost empty on the morning of the 4th April. She returned as soon as she could coal, &c., and was sighted off the island early on the morning of the 7th, took her passengers aboard again, got under weigh at 4 p.m., and after a pleasant run of 44 hours, arrived in Port Jackson at noon on the 9th April.

We were thus on the island nine days, but the weather was so boisterous for part of the time, and the rain so incessant, that collecting was seriously interfered with. Fortunately I had brought my vascula and presses ashore in the whaleboat, so that things might have been far worse. I botanised as high up as 1200 feet, reaching that elevation on two occasions, and went over the greater part of the island. Ascent to the top of either Mt. Gower or Mt. Lidgbird was physically impossible, as there is no shelter; this remains a pleasurable task to be undertaken at a favourable season. It is, of course, near the summits of the mountains that one is most likely to find additions to the flora of the island.

Examination of my collections has been greatly facilitated by reference to Mr. W. B. Hemsley's excellent "Flora of Lord Howe Island."* In the lists that follow I have not repeated the name of a species in Mr Hemsley's list unless I have some additional information (however small) in regard to it. Most of the species enumerated by Mr. Hemsley were collected by me and are now in the herbarium of the Sydney Botanic Gardens. I have arranged my plants in the sequence adopted by Mr. Hemsley, and my observations may be looked upon as supplementing his work.

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* *Annals of Botany*, Vol. x. No. xxxviii. p. 221 (June, 1896).

Meteorology.

Reference is suggested to Mr. H. C. Russell's paper* on the subject, showing the mildness of the climate. It is a windy island, perhaps in some measure caused by the great height of the mountains for so small an island. I was informed that it is no uncommon thing for it to blow strongly for three months at a stretch. The gusts are so strong that the houses are built low, and verandahs are unknown. Care is taken not to leave about such objects as the wind may take hold of and blow away. In consequence the "wind-break" question is perhaps the most important on the island, and most writers lay emphasis upon it. Every patch of cultivation is protected by belts of indigenous or planted trees, and these wind-breaks are watched with the greatest solicitude. The air is also humid and laden with saline matter; this was greatly against the preservation of botanical specimens. I was on the island during stormy weather, and the wind took up the sand and blew it with such force that it stung our faces, and our horse would not face it. Again, the salt spray blew nearly across the island, in one place blasting the vegetation as if it had been scalded. The rainfall is probably high. Much rain fell during our stay, and we saw many signs of land-slips of various degrees of magnitude, some of them of much importance.

As regards wind-breaks, the average Australian settler begins by cutting down as much vegetation as he can. This was the

Kei Apple *(Aberia Caffra)* and the Tall Bamboo (*Bambusa arundinacea)* have been tried.

I have recently despatched plants of *Pittosporum undulatum* and of Olive to the island. They should flourish, making excellent wind-breaks, while the Olive should be a useful addition to the economic plants.

Some Minor Notes.

There is only one road (the coast road), mainly following the coast-line on the western side of the island; it is really only a beaten track, and it has short branches to the various houses and gardens. It is difficult to travel in the island except on these tracks, as the vegetation is so dense, hence one collector has largely followed the footsteps of another in most parts of the island.

There is no wheeled vehicle on the island, sleighs being used, drawn by one horse. They are shod with 3in. iron runners, and one can move rapidly along the coast road by their use. By the way, our horse (Norfolk Island bred) was so unlike Australian horses in that he would not eat corn, but he was ravenous for bananas and sweet potatoes.

We saw no wild pigs, although we were informed that there are still a few on the tops of Mt. Lidgbird and Mt. Gower. The same remarks apply to the goats, a few of which are also to be found on Goat or Rabbit Island. These animals largely feed on Palm seeds and on the tubers of *Elatostemma.* The islanders now keep the pigs in styes, as their destructiveness to the vegetation in the past is now well known to them. This is a matter of great congratulation to those interested in the preservation of the flora of the island.

Cockroaches are very abundant and damaged my herbarium specimens in spite of all my care.

The oranges and bananas are apparently quite free from pests. The field crops are, however, much injured by both fungus and insect pests I was assured that at one time it was a common practice of the islanders to use a dead shark as an insecticide.

This brilliant idea was borrowed from Tasmania, and the odour of the decaying shark would drive away the aphis from a cabbage patch, for example. I should imagine that it would drive away the owner too.

Vernacular names are applied to plants on the island with great unanimity, and also with absence of variety; this is doubtless to be attributed to the smallness of the population and the frequent occasions on which they associate with one another.

Most of the male population have been sea-faring men and have spent much of their time in the tropical South Sea Islands. In consequence they are very apt to give names to plants on account of their resemblance to those growing in Fiji, Samoa and other places. I have alluded to this on p. 126.

In other respects there is a slight tendency to depart from the English of the mainland. Thus hills are called "ribs," and creeks (especially mountain creeks) are known as "runs."

Bibliography.

I give some bibliographical references to supplement those given by Hemsley, at p. 283 *(op. cit.)* and also the introduction to his Flora. Nos. 1-5 I have given at some length, partly because at the present time most of the publications are rare, and partly because it is necessary that the references in so important a publication as Hemsley's work should be as explicit as possible

Mr. Moore's sketch of the vegetation occupies pages 6 to 9. Interesting notes on the Botany are to be found in sketches by Mr. R. D. Fitzgerald at p. 13, and by Mr. E. Hill at pages 17 and 18.

2.—The same as No. 1, except that it is printed in 8vo. and occupies 60 pp. (The statement that the Reports have been submitted to Parliament is omitted).

3.—1869. New South Wales. Lord Howe's Island (Sketch of the Vegetation of, by the Director of the Botanic Gardens). Folio, pp. 4.

This report is the same as Mr. Moore's botanical report printed in No. 1 (and No. 2). From the date it is obvious that the original intention was to present it to Parliament by itself, but that it was held back for incorporation with the reports of the Water Police Magistrate and Mr. Hill, with which it forms No. 1.

This is the publication quoted by Hemsley as "Moore, Rep."

4.—1882. New South Wales. Lord Howe Island (Report on present state and future prospects of). Presented to Parliament by command. Report of Hon. J. Bowie Wilson to the Colonial Secretary, dated 19th May, 1882. Folio, pp. 12, with two folded maps.

5.—Report on the present State and future Prospects of Lord Howe Island, by the Hon. J. Bowie Wilson. Published by authority. Sydney, Thomas Richards, Government Printer, 1882. 4 to. pp. 40. A reprint of No. 4, with the following additions, - table of contents, list of illustrations, introductory historical notes, pp. 1-9, together with 17 reproductions of photographs representing scenes on the island (and Ball's Pyramid).

This is the publication quoted by Hemsley as "Wils. Rep."

Following is a publication of much interest:—

6.—1853. New South Wales. Proposed New Penal Settlement. Ordered by the Council to be printed, 9th December, 1853. Chs. A. Fitzroy, Governor-General. Message No. 53.

Fcp. 17 pp. with one folded map or sketch (to illustrate Dr. Foulis' Report. See below).

A number of minutes and reports are here collected together, of which the following are of special interest to us :—

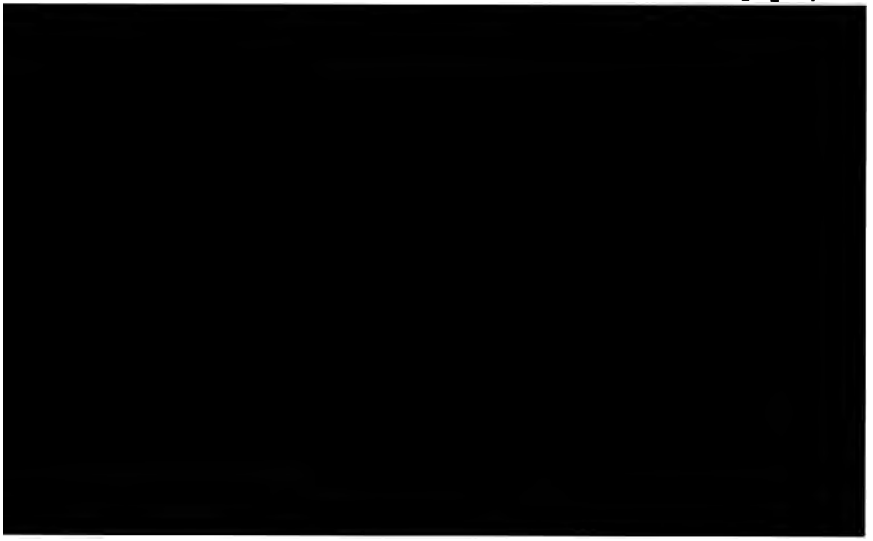
a.—[Enclosure in No. 3]. Report of H. J. White, Assistant Surveyor, dated 7th January, 1835. [N.B. A reproduction of his map will be found in Nos. 1 and 2].

His Report is very brief. He gives the acreage at 3,230. He states "The only grass* to be found is a narrow belt close to the beaches, which is of a very coarse description. There are seven kinds of timber, principally of a hard and knotty description and very small. The wild fig† and cabbage trees‡ are the most abundant. . . . There is a . . . garden containing potatoes, carrots, maize, pumpkins and tarra" [taro.]

b.—[No. 5]. Statement of circumstances in reference to Lord Howe's Island, situated off the coast of New South Wales, between the Heads of Port Jackson and Norfolk Island, furnished by Dr. Foulis, of Sydney.

This is the Report that Etheridge refers to at p. 4 of *Aust. Museum Mem.* No. 2 (1889). It is referred to in *Wils. Rep.* p. 4.

The map or diagram that accompanied it is entitled "Sketch of Lord Howe Island, referred to in Dr. Foulis' Report," and was lithographed by J. Allan, 2 Bridge-street. It is on blue paper,



rather a general character, and its value consists mainly in the map or sketch that accompanies it.

c.—[Encl. 1 in No. 12]. Remarks upon Lord Howe Island, by Capt. H. M. Denham, R.N., F.R.S. Dated 20th August, 1853.

Not of a botanical character. Refers to the "indigenous esculent, the Palm Cabbage," and speaks of "a profitable export of that close-grained timber to be found on the slopes, section-specimens of which are herewith presented." Alludes to the importance of wind-breaks.

d.—[Encl. 2 in No. 12]. Remarks on the Natural History and Capabilities of Lord Howe Island, by John Denis Macdonald, Assistant Surgeon to the Expedition (that of H.M.S. "Herald," Capt. Denham, Exploring Expedition to the South Pacific).

This consists of nearly four folio pages, and is the most important of all the documents with which it is associated. He speaks of a strip of land "now covered with tall rank grass and a British cruciferous plant (*Senebiera coronopus*).* Insists on the importance of wind-breaks. . . . "Gigantic banyan trees (*Ficus indica*)† are scattered in groups through the low lands, and the offsets from each tree are so numerous, and attain so large a size, that it is difficult to define the exact limits of any particular tree, or even point out the primitive trunks. The free extremities of the younger offsets divide into a bundle of rootlets, which ultimately reach and fix themselves in the soil. Cabbage palms grow in the valleys and on the flats, while a remarkable species of pandanus or screw pine flourishes on the sides of the hills. This has received the name of tent tree‡ from

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* Perhaps *S. didyma*, Pers. (*Coronopus*, Sm., but not the *S. coronopus* of Poiret). Although this weed has been found on the island, from my knowledge of the situation referred to I believe *Lepidium* was really seen.

† *F. columnaris.*

‡ *Pandanus Forsteriana.*

the peculiar arrangement of its roots, which, taking their rise all round the main stem at determinate heights corresponding with the period of their formation, extend themselves outwards and downwards until they become fixed in the earth, so that the central trunk is supported by a cone of props, easily convertible into a tent. The leaves of this plant are usually developed in three spirals passing from right to left, but instances occur in which they take an opposite direction. Its fruit is composed of fibrous drupes clustered together in little parcels round the spadix. They are of a bright red colour when ripe, and are supposed to possess aperient properties, but the children of the island eat them with impunity.

"It is quite remarkable to observe the great variety of trees which present a similar character of foliage, but which differ so much in the texture and quality of the timber. With the exception of the palm tribe and some of the plants which have been introduced by the settlers, the prevalent form of simple leaves, as well as of the leaflets of compound ones, is ovate and acute. The creeping plants of the forest are very numerous, and not at all to be distinguished by their trunks or stems—many of which attain a diameter of four or five inches. From the tortuous way in which they trail along the ground, entwine and interlace with one another, scale the loftiest trees, wander through their closely set branches, descend and mount again, deriving fresh succour

"At a zone in the mountains the cabbage palms diminish in size, and a little higher up they fail altogether, but another species with entire leaves supplies their place, with a variety of trees not found in a lower position. A poisonous leguminous plant bearing large green pods,* a pale violet *Lobelia*,† and many other Australian weeds, grow in different parts. A poisonous umbelliferous plant,‡ with deeply divided leaves and lateral umbels, grows plentifully in moist places. The *Senebiera coronopus*§ (one of the British Cruciferæ) flourishes in wild luxuriance on both sides of the island, more especially on the sandy parts. The Shepherd's Purse,‖ the common chickweed,¶ the sow-thistle,** the butter-cup†† and daisy‡‡ grow wild upon the island; but the two latter are only to be found in the mountainous parts. The Lignum Vitæ§§ or Guaiacum tree and other useful woods grow on the hills. There are many species of ferns, mosses, and fungi, and the sea-weeds are very numerous.

"All the fruit trees and culinary vegetables at present growing on the island have been introduced – the bananas and vines from Port Stephens, melons, Cape gooseberries and mint from Sydney. The potatoes have been chiefly grown from Derwent (Tasmania) seed. Some time ago egg-plants and marsh [? musk—J.H.M.] melons were plentiful, but they have been neglected latterly. . .

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* *Canavalia obtusifolia*. Forrest also records a case in which the raw seeds poisoned sailors. See my *Useful Native Plants of Australia*, p. 12.

† *L. anceps*.

‡ *Apium australe*, without doubt. I was not aware, however, that it is actually poisonous, although Umbellifers growing in such a situation are often acrid.

§ *Ante*, p. 119.

‖ *Capsella Bursa-pastoris*. Moore, *Rep.*, p. 2, has since recorded this. I did not observe it, and it may have been exterminated.

¶ Probably *Cerastium vulgatum*.

** *Sonchus oleraceus*

†† Probably a mistake. Ranunculus has not been found on the island. See p. 136.

‡‡ Perhaps *Brachycome se mentosa*.

§§ *Sophora tetraptera*.

[illegible] p. 112
[illegible] p. 114
[illegible] p. 115
[illegible] p. 116
[illegible] p. 123
[illegible] p. 126
[illegible] p. 144
[illegible] p. 147
[illegible] p. 148
[illegible] p. 151

after about two hours' hard pulling. The weather continued to increase in violence, so that return to the ship became impossible that day. Next day the weather increased in severity to a gale, and finally, on the afternoon of the 31st March, the "Thetis" broke her anchors and steamed for Sydney, which she reached after a perilous voyage, arriving with bunkers almost empty on the morning of the 4th April. She returned as soon as she could coal, &c., and was sighted off the island early on the morning of the 7th, took her passengers aboard again, got under weigh at 4 p.m., and after a pleasant run of 44 hours, arrived in Port Jackson at noon on the 9th April.

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* *Annals of Botany*, Vol. x. No. xxxviii. p. 221 (June, 1896)

"Exogenous timber is plentiful, of any required size; the leaves of tables 4 feet by 5 and upwards have been cut in single pieces from banyan roots, as well as those from another species of hard-wood which is very common."

These extracts show how excellent an observer Dr. Macdonald was. His report was submitted by Capt. Denham, of H.M.S. "Herald," on 23rd August, 1853, and the letter of Macgillivray (Naturalist of the "Herald") published in Hooker's *Journal of Botany*, vi., 353, was dated 3rd March, 1854. Macdonald's account of Lord Howe is much ampler than that of Macgillivray.

Macdonald's observations on the zoology of the island are, I should imagine, valuable, and his geological observations scarcely less so, but they of course do not come within the scope of a botanical paper. The report is certainly rare; I have only seen one copy, and this partly is my excuse for publishing these lengthy extracts.

7.—Corrie, Alfred T. A Visit to Lord Howe Island. *Proc. R.G.S.* Vol. xxii., 136 (1878).

This article contains but scant reference to botanical matters.

8.—Etheridge, R., Junr. Note on the Bibliography of Lord Howe Island. *Proc. Linn. Soc. N.S.W.* [2] iv. 627 (1889). Mr. Etheridge draws attention to No. 6, and lays special stress upon Dr. Macdonald's paper. He further discusses some geological points. I had forgotten Mr. Etheridge's paper when I wrote my own, and Mr. W. S. Dun very kindly drew my attention to it.

[redacted]

Fitzgerald, R. D. 1869, 1871, Survey Department, Sydney.

Fullagar and Lind, 1871, collectors in the pay of Baron von Mueller.

Etheridge, R., Jun., and Whitelegge, T., 1887, Australian Museum, Sydney.

DICOTYLEDONS.

MAGNOLIACEÆ.

DRIMYS HOWEANA, *F.v.M.*—Known as "Hot-bark" by the settlers. A slender small tree.

CRUCIFERÆ.

CAKILE MARITIMA, *Scop.*—Apparently rare. Not in Hemsley's list.

LEPIDIUM FOLIOSUM, *Desv.*—Hemsley inserts this plant on Mueller's authority, not having seen indubitable specimens himself. I have brought specimens which undoubtedly belong to this species, having six stamens and conforming to the description of *L. foliosum* in other respects.

GUTTIFERÆ.

CALOPHYLLUM INOPHYLLUM, *Linn.*—Hemsley follows Moore, *Proc. Roy. Soc. N.S.W.*, v. 31 (though doubtfully), in giving this plant a place in the flora of the island. Moore and Betche exclude it from their list of Lord Howe Island plants in their "Handbook of the Flora of New South Wales." Under *Elæodendron* I have shown how, in my opinion, *Calophyllum* came to be recorded as an addition to the flora. I recommend that it be now dropped.

MALVACEÆ.

HIBISCUS TILIACEUS, *Linn.*—"Kurrajong." Found on Middle Beach road, also in a swamp on Edward King's property. The specimen on the side of a creek near the old settlement was planted. The bark is soaked in sea-water for 24 hours, when the fibre "makes better fishing lines than we can buy in Sydney."

The bark is used for tying up bags. King informed me that the plant is called "Tooran" in the tropical islands, but I cannot trace such a name.

LAGUNARIA PATERSONI, *G. Don.*—Abundant. Known as "Sally" on Lord Howe Island, but "White Oak" in Norfolk Island. The wood is put to no purpose except to yield grubs for fishing, it being attacked almost as soon as it is felled. The same remarks apply to "Pine" (*Panax cissodendron*). The islanders say that a pretty blue beetle which is very common, is found only on *Hibiscus tiliaceus* and on this species. Cattle eat the leaves.

RUTACEÆ.

ACRONYCHIA BAUERI, *Schott.*—"Box or Yellow Wood." Three Box Woods or Yellow Woods (including the present species, *Melicope contermina*, Moore & F.v.M., and *Zanthoxylum Blackburnia*, Benth.) are recognised on the island, and they are extensively used for fencing (posts) and general building purposes; they are said to be the best timbers on the island for these uses; they are durable, split easily and work well.

MELIACEÆ.

DYSOXYLON FRASERANUM, *Benth.*—"Apple-tree." Rather plentiful, but does not come below 1,000ft., and hence is not used. Its diameter is from 1′–2′.6″. It is of course the same as the "Rosewood" of the mainland, which is a valuable timber.

work (1893). I did not find *Elæodendron australe*, although it is very familiar to me; this is, of course, not conclusive evidence.

As a rule our fruits of *E. australe* (from the mainland) appear to have one-celled ovaries, with one developed seed, the second cell, where originally present, having aborted, as pointed out by Bentham. In many cases I cannot see a trace of a second cell. The same remarks apply to var. *melanocarpum*. The distinction "ovary 2-celled" as applied to *E. australe*, and "3-celled" as applied to its variety, appears to me to fall to the ground. I see no constant difference between the fruits of the two plants except in colour, and even in *melanocarpum* there is always a tinge of red endeavouring to assert itself through the superficial colouring of black.

I recommend *E. australe* to be deleted from the list of Lord Howe Island plants.

ELÆODENDRON MELANOCARPUM, *F.v.M.*—Although Mueller proposed this name for a species in *Fragm.* iii. 62, he revoked it in *Fragm.* vi. 204, and he definitely alludes to it as a variety of *E. australe* (viz., *E. australe*, var. *melanocarpum*) in *Fragm.* ix. 77. He omits *E. melanocarpum* in his *Census of Australian Plants* (1889). I follow Mueller in depriving *E. melanocarpum* of specific rank. Hemsley, doubtless in consequence of Mueller's reference at *Fragm.* ix., gives *E. melanocarpum* as a Lord Howe Island plant. I recomend its elimination from the list, not only on the grounds stated, but because the black-fruited *Elæodendron* of the island is *E. curtipendulum*, Endl. To be specific, I am of opinion that neither *E. australe* nor its dark-fruited variety is to be found on the island.

ELÆODENDRON CURTIPENDULUM, *Endl.* (Prod. Floræ Norfolkicæ [1833], p. 81).—Called "Tumana" on the island; not uncommon. The tree is certainly neither *E. australe* nor its var. *melanocarpum*. I do not doubt that it is *E. curtipendulum*, Endl., the only point of non-agreement with Endlicher's description being that my fruits are not "nutantes" or pendulous (*curtipendulum*), a detail quite satisfactorily explained, in my opinion, by the fact that my

fruits are not perfectly ripe. The ovary is usually 3- but sometimes 4-celled. Endlicher's description of "greenish-black" describes the colour of the fruit well. They are more egg-shaped than those of the Australian Elæodendrons. They are quite tapering at the top until nearly ripe, this pointed appearance giving them an unusual appearance for an *Elæodendron* in this part of the world. The tapering appearance is owing to the delayed absorption of the style. The same thing may be noticed in *E. Roxburghii*, W. et A. pl. 71, t. 5, of Wight's "Illustrations of Indian Botany," Vol. i.

E. curtipendulum has hitherto only been recorded from Norfolk Island; it is now recorded, for the first time, as indigenous to Lord Howe Island.

E. curtipendulum goes under the name of "Tumana" in Lord Howe Island. It has a bark of a very red colour when fresh, its wood is red, and it reminded the islanders, most of whom are old sailors, to whom the tropical South Sea Islands are familiar, of *Calophyllum inophyllum*, which is widely known as Tumana. That being the case, what more simple than to christen this nameless wood Tumana. I have no doubt that through their furnishing a list of the trees of the island to Mr. Moore, nearly 30 years ago, he announced that the genus *Calophyllum* occurs in the island, placing reliance on their vernacular name of Tumana. It is a very common practice with the islanders to give plants the names of Australian or Polynesian plants they

Capsula dura, intus tomentosa. Semina arillo coccineo perfecte circumclusa."

I concluded from the above that Mueller had seen fruits of a Lord Howe Island *Cupania*, but the words "Capsula . . . . 'circumclusa'" have been added from an Australian specimen of *C. anacardioides*, Mr. Luehmann informs me, and Mr. Luehmann also states that the Baron never saw fruiting specimens from Lord Howe Island.

In *Fragm.* ix., 77, I find also the following statement:— "Nephelium a N. semiglauco fructibus majoribus diversum."

I cannot trace a second *Cupania (Nephelium)* in the Melbourne herbarium. Tate *(Macleay Mem. Vol.)*, as Hemsley points out, admits *N. semiglauca* to the flora of Lord Howe Island without a sign of doubt. The latter adds "There is not a second species *(Cupania* or *Nephelium)* from the island in the Kew herbarium." I believe this is accounted for by the fact that there is not a second species on the island. The *Cupania* in question possesses undoubted affinities to both *C. anacardioides* and *C. (N.) semiglauca*, but I brought back both flowering and fruiting specimens which enable me to clear up the points in doubt and to state that the tree is not referable to a described species. Following is a description of it:—

A tree 30 or 40 feet high with a trunk-diameter of 12-18 inches as seen. Nearly glabrous, except the young shoots, which are densely covered with rust-coloured hairs.

Leaflets 4 to 10, usually 6 or 8, about 2½ inches long by $\frac{5}{8}$ or $\frac{3}{4}$ inch broad, oblong, very obtuse, entire, margins somewhat recurved even in a fresh state, but when dried remarkably so. Coriaceous, pale underneath, scarcely shining above. The midrib and primary veins well defined and of a brown colour, not so prominent on the upper surface. Very shortly petiolate or sessile.

Flowers comparatively large (as large as those of *C. anacardioides*) in panicles rarely exceeding the leaves. Pedicels usually ¼ inch. Outline of the sepals sinuate, the margin membranous, the smallest about 1 line broad, the largest (the innermost) at

least twice that size. Petals about as long as the inner se with large inflected auricles at the base, almost doubling petal into the shape of the split corolla of a Goodeniaceous p sprinkled with hairs chiefly on the edges and margin of the aur Stamens 8, the filaments densely hairy almost for the whole of length (in *C. anacardioides* hairy only for the lower half or th Anthers oblong, smaller than in *C. anacardioides*. Attach of filament to anther peltate. Ovary glabrous or occasionally a few long hairs on the edges. Capsule glabrous, with coriac very compressed valves, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter. The v glabrous inside and showing a thickened margin as in *C. glauca*. Very shortly attenuate at the base, on thick pedice 3 lines; the sepals persistent. Seeds compressed, about 5 long, smooth, not shining. Arillus thin, membranous.

The principal tree called "Honeysuckle" on the isl Differs from *Cupania (Nephelium) semiglauca* (to which nearest allied) by the larger capsules and the shape of the pe

The fruit sharply separates it from *C. anacardioides*, which it also differs in the number of stamens, the hairine the filaments and the glabrous or nearly glabrous ovary.

LEGUMINOSÆ.

CARMICHÆLIA EXUL, *F. v. M.*—Known as "Grass-tree," as

MYRTACEÆ.

MELALEUCA ERICIFOLIA, *Sm.*—The settlers have an idea that this is identical with a New Zealand shrub, and call it the "Kilmauk" or "Kilmogue" of N.Z., but the plant does not occur in that colony. The leaves are coarser, shorter, and more rigid than they usually are on the mainland. It no longer appears to be used medicinally or otherwise by the settlers.

ACICALYPTUS FULLAGARI, *F.v.M.*—Known as "Scalybark." A large tree with a diameter up to 5 or 6 feet, and in some cases with buttresses big enough to stable a horse. It is the timber most frequently sawn (by pit-saw) for ordinary purposes on the island. It is surface-rooting like most of the local trees. I have heard it called "White Cedar," because it is soft cutting and works like Australian cedar, but this is far-fetched. Wilkinson (Duff) *Wils. Rep.* p. 22 is mistaken in calling this tree "Honeysuckle."

METROSIDEROS POLYMORPHA, *Gaud.*—"Red Cedar" is the name this small tree frequently goes by, but it is far-fetched, as is the designation "White Cedar" for *Acicalyptus*.

UMBELLIFERÆ.

APIUM PROSTRATUM, *Labill.* (Syn. *A. australe*, Thou.).—Known locally as "Wild Celery." King informed me that this plant has been cultivated on the island, and an inferior celery produced.

RUBIACEÆ.

RANDIA STIPULOSA, *C. Moore & F.v.M.*—Has been labelled in the Sydney Botanic Gardens *R. macrophylla* for many years. It is known as "Green Plum" from the colour of its large fruit. The timber is said to last well in the ground, and it burns well.

PSYCHOTRIA CARRONIS, *F.v.M.*—A slender small tree bearing a profusion of black fruits as large as small grapes, which render it ornamental and win for it the common local name of "Black Grape."

COPROSMA PUTIDA, *C. Moore & F.v.M.*—"Stinkwood." Has ornamental red fruits. A twig or leaf broken emits a bad odour,

while a log of the timber placed on the fire by accident will render a house unbearable. Certainly the poetry of the charming rambles in Lord Howe Islands is sometimes destroyed by ill-smelling vegetation accidentally brushed against and bruised. Cattle eat the leaves.

COMPOSITÆ.

OLEARIA BALLII, *F.v.M.*—Ascent to Mt. Gower, on the faces. Not lower than 1,000ft. above sea-level.

CASSINIA TENUIFOLIA, *Benth.*—This plant is known as "Broom-bush" or "Tea-tree." *Cassinias* are never known as "Tea-trees" on the mainland. The silvery whiteness of the young foliage is striking in appearance.

COTULA AUSTRALIS, *Hook. f.*—Not in Hemsley's list.

SONCHUS OLERACEUS, Linn.—Not in Hemsley's list. I am of opinion that it is indigenous, although I find that Moore (*Report*, p. 3) is inclined to a different opinion.

EPACRIDEÆ.

DRACOPHYLLUM FITZGERALDI, *F.v.M.*—The inflorescence is at the end of the long spreading branches, and is erect, reminding one of the habit of Horse-chestnut blossom. The colour of the flowers is a pale flesh-pink. This noble tree is up to 6 feet in diameter. The timber burns well, but is not otherwise used, fortunately, because it does not descend below a thousand feet

Lord Howe Island. I am endeavouring to procure additional botanical material, in order that its position may be settled. I have given a figure of the fruit.

The fruit is an indehiscent drupe, the fleshy husk or testa being thinner than in the common walnut, and of a bluish or glaucous cast (hence the vernacular name). Like the walnut, this encloses a hard-shelled two-valved nut. I have collected them 3 inches long and $1\frac{3}{4}$ broad. In spite of the nut being narrower in proportion to its length, and of its possessing well-marked longitudinal ribs, there is no doubt it resembles that of the walnut a good deal, and it is the only nut on the island, as far as I know, which possesses such a resemblance to *Juglans regia*. Unfortunately it is not edible.

It extends from the coast high into the mountain, and is very abundant. Its fruit was frequently to be seen on the ground. It is often washed into the sea-water, and the ribbed, bony inner layer of the pericarp forms a readily noticeable object when washed back on to the beach. It would preserve its characters after prolonged immersion in sea-water, and I suggest that collections of drift-fruits be examined for it.

Wilkinson (*Wils. Rep.*, p. 22) refers to Blue Plum, which he (or rather Duff) erroneously attributes to *Elæodendron*, and this is the only record I can find of the name, which is, nevertheless, in common use by the islanders.

JASMINEÆ.

OLEA PANICULATA, *R.Br.*—"Maulwood." Found all over the island, and up to a thousand feet elevation. Attains a diameter of 4 feet. Used for fencing, firewood and all purposes.

APOCYNEÆ.

ALYXIA RUSCIFOLIA, *R.Br.*—Very plentiful and known as "Holly" and "Christmas Bush," the former on account of its shining rigid foliage, the latter on account of its bright red fruits.

OCHROSIA ELLIPTICA, *Labill.*—Known as "Mangrove," and the fruits are believed by the islanders to be poisonous.

LORANTHACEÆ.

VISCUM ARTICULATUM, *Burm.*—Very abundant on the is
Without special search, I observed it on *Elæodendron cur*
dulum, *Cryptocarya triplinervis*, *Hemicyclia australasica*,
rosma putida, and *Pimelea longifolia*.

EUPHORBIACEÆ.

HEMICYCLIA AUSTRALASICA, *Muell. Arg.*—"Grey Bark."
of the handsomest trees on the island, its rich glabrous fo
setting off the profusion of orange-coloured and red fruits.
well worthy of cultivation. It is the only tree on the islan
which I observed variegated leaves. The islanders use it for
wood. The best Jews' Ear fungus (*Hirneola*) grows on this

BALOGHIA LUCIDA, *Endl.*—Not used on Lord Howe Island
the islanders state that its red astringent juice is commonly
as a stain for furniture made of Pine (*Araucaria excelsa*).
Lord Howe Island it attains a trunk-diameter of 18" to 2'.

OMALANTHUS LESCHENAULTIANUS, *A. Juss.* (Syn. *Carumi*
populifolium, Reinw.).—Abundant on the island, and know
"Dog-wood." Has corky excrescences resembling those
Pisonia, but less marked. In Samoa the leaves are used
poultice to reduce the swelling and inflammation after cir
cision.

URTICEÆ.

rich soil in the brushes at the sea-level, and close to the sea, while it is common as high in the mountain as I ascended. It forms large tubers which form excellent pig-feed. When pigs were allowed to roam at will over the island, they used to largely feed on both the tubers and foliage of this plant. In Moore's list (1869) the name of the species is given as *E. nemorosum*, Seem., (see tab. lxi. *Fl. Vitiensis*), and certainly the two plants are very closely allied.

BOEHMERIA CALOPHLEBA, *F.v.M.*—This plant is often associated with the *Elatostemma*, and its range is precisely the same, so far as I observed it, although it is far less common. It is strikingly like *Pipturus argenteus* of our northern rivers, and in the absence of books I noted it in my pocket-book as *Pipturus*. I am of opinion that the reference to *Pipturus* in Moore's paper (*Trans. Roy. Soc. N.S.W.* v. 31) was suggested by this plant, in spite of the fact that the list in this paper and also in Moore's 1869 list contains *Bœhmeria sp.* I can hardly agree with Hemsley (*op. cit.* p. 284) that *Pipturus* is a slip for *Elatostemma*, as the appearance of the two plants is so widely different, particularly when growing.

Genus ? ———— (Plate III.)

BLACK PLUM.—I came across a tall tree with smooth bark, and purplish-black fruit (hence the name of the tree). It does not descend below a thousand feet, growing where *Hedyscepe Canterburyana* grows.

The plant is not in Hemsley's list, nor in Endlicher's *Prod. Ins. Norfolk.* I do not doubt that it is the tree referred to by name only by Wilkinson (Duff) in *Wils. Rep.*, p. 22, as "Black Plum, *Achras australis*." The fruit certainly does bear a superficial resemblance to that of *Achras australis* of the mainland, but only a superficial one.

Unfortunately I collected only leaves and fruit, and as it will be some time before I can obtain flowering specimens, I describe the material I have got, leaving the naming of the plant for a future occasion.

Twigs more or less angular, the petiole slightly twisted and about half an inch long, leaves alternate, broadly ovate or nearly orbicular, coriaceous, shiny on the upper surface, entire, the venation reticulate-pinnate, usually with 5 or 6 primary veins on each side of the midrib. The largest leaves seen are 4¼ inches long by 3¼ broad, the average perhaps 4 inches by 3. Stipules linear, half the length of the petioles.

Fruit deep purple or nearly black, nearly egg-shaped or perhaps approaching an ellipse (half as long as broad) in longitudinal section, and sometimes with a blunt point at the apex. Size—say, 2½ inches long by 1½ broad by 1 inch thick.

Removal of the thin husk displays the embryo with two fleshy plano-convex cotyledons filling the seed; the embryo is clothed with short brown hairs. The radicle is inferior.

Bearing in mind Hemsley's note on the subject (*op. cit.* p. 281), I made careful search for *Cordyline*, *Ranunculus*, *Epilobium* and *Veronica*, but found none.

MONOCOTYLEDONS.

IRIDEÆ.

MORÆA ROBINSONIANA, *F.v.M.*—The "Wedding Lily." This grows in basaltic soil right on the edge of the rocky shore, where it is plentifully bathed with sea-spray. There I noticed patches

eat it) that it would hide the bullocks. Robins informed me that he has been using his best endeavours to eradicate it for the past five years. With difficulty he collected for me two or three specimens. In habit the plant seems to be more like *J. pallidus*, but in the absence of stamens and seeds one could not say that it is not *maritimus*.

PALMÆ.

The mountain roads, or rather tracks through the palms extend for miles, and words cannot describe the exquisite beauty of the scenery. After the first few hundred feet of ascent, the palm in greatest abundance is "Curly Palm" *(Kentia Belmoreana)*, and apart from the beautiful mountain and marine scenery, the marvellous profusion of palms of all sizes, their overhanging foliage frequently meeting overhead, made an impression on me that will never be effaced from my memory.

Collection of Palm-seeds.—The collection of palm-seeds (fruits), or "seeding" as it is commonly called, is the staple industry of Lord Howe Island. Seeding is performed by climbing the trees, work which is now mainly done by the boys of the island or hired boys (usually lads indentured through the Charitable Institutions Department of N.S.W.). They buckle a leather strap (or strap extemporised from palm-leaves), pass it over both ankles, and by its aid can "shin" the trees with a minimum of fatigue. When the spikes of seeds are reached they are jerked off by a smart downward pull; all the spikes are placed in one hand and thus carried down to the ground. The fruits (seeds or "nuts") are then removed from the spike by holding the spike firmly in one hand and pressing each fruit off by the thumb of the other.

The average load down the rocky mountain paths is one and a half bushels for strong boys of say 15 years of age, and perhaps two bushels for an ordinary man. The maximum load is three bushels, but this is only carried by the strongest young men, and perhaps the carrying of so heavy a load has something of bravado in it, for when they arrive at the coast-level they are usually

pretty well tired out. The seeds are put into gunny-bags, and all bags are conveyed down the mountain in the "cubby," a kind of knapsack arrangement borrowed from New Zealand, for it is a Maori device for carrying their children. The cubby is a sort of parallel braces, and by its use the carrier of a load can have both hands free. A load having been fixed up in the cubby, it is placed on sloping ground, and the bearer lies on his back, places his arms through the knapsack loops, and raises himself to an erect position.

Palm-seed if planted when *just changing colour*, will germinate more readily (Edward King says three months earlier), than those which are dead-ripe. A drawback to dead-ripe seeds is the readiness with which they are attacked by weevil. It is recommended to ship Thatch and Umbrella Palm seeds when yellowish, as they carry best at that stage.

Thatch Palm.—The leaves of K. FORSTERIANA are, as is well known, used for thatching purposes; the stems, cut to four, were at one time largely used for battens, but now they are rarely put to such use as the trees are too valuable as seed-yielders.

The largest trees of this species are on the Boat Harbour flats on the south-east side of the island. There they attain a diameter of 18 inches or 2 feet and a height of 60ft. This species grows in belts all over the island.

This and the other two palms (the Curly Palm alone excepted) take twelve months to mature the seeds after the flower appears

the tree for fully 50 feet and brought me the inflorescence in perfect condition. Because of its delicate nature I took a sketch of the spatha on the spot, and also made the notes which follow. I produce the spatha to-night, and regret my efforts to preserve the inflorescence were not attended with success. My attendant conveyed it tenderly down the mountain and very few flowers became detached. It was raining and the air near the coast was laden with saline matter in addition, so that ordinary methods of plant-drying were out of the question. I was destitute of appliances and decided to plunge it into boiling water, and hung it from a rafter to drain, but the continued damp weather never permitted it to dry, and in spite of all I could do I was unable to land it in Sydney in good condition. On my next visit to the island I will make special preparations with the view of properly preserving it.

The spatha was hitherto unknown. I was fortunate to obtain one specimen. Situated as I was I was quite unable to preserve such an organism as palm-inflorescence, which is a difficult matter under favourable circumstances, but I made a few notes on the inflorescence within a few minutes after its collection.

Male flowers in pairs. Two (or one pair) to each notch. The flowers have a sickly smell, as indeed have those of most palms. The inner perianth of the male flowers consists of 3 almost equilateral segments, one of the segments being distended so as to form a solid angle. The colour of the perianth shades from pale orange-red to pale yellow or yellowish-green at the tip. The stamens ten in all the flowers I examined.

Some of the flowers are hermaphrodite, according to my notes, there being a central club-shaped pistil, contracted somewhat in the centre of the style, the stigma not trifid as is usually the case with palms. This is probably an unfertilized ovary.

The shape of the spatha is shown in the drawing. (Plate IV., figs. 1-2.) Length 13 inches, greatest width 6 inches.

The spatha is rather thin, showing longitudinal markings. It is thickened along the edges and at the top and base. It is

situated immediately above the last season's fruits, and immediately below the long sheathing base of the petiole.

I removed from the tree some inflorescence which had lost its spatha. It was 12 inches long and 10 broad.

The sheathing base of the petiole has been already described by Duff (*Wils. Rep.* p. 31).

Mountain Palm.—CLINOSTIGMA MOOREANUM, *F.v.M.*, is exclusively confined to the tops of the highest mountains, where it is subject to considerable cold. Its maximum height is 10 feet.

Uses of Palms.—I have alluded to thatch and battens under *K. Forsteriana;* palm-leaves are eaten by cattle, but only the tips of the leaf-segments, stock never cropping them close to the rhachis except in cases of extreme hunger. Palms are used for wind-breaks, and are planted for that purpose.

PANDANEÆ.

My predecessor, Mr. Charles Moore, who visited the island in 1869, says, *Moore Rep.* p. 2, "The Pandanus or Screw Pine, of which there appear to be two species, marks the vegetation in a peculiar manner wherever it appears. One species, known to the settlers as the "Tent Tree," *Pandanus Forsteri*, Moore, grows plentifully in some parts of the flats, but is more general on the mountain sides, increasing in number as they ascend, and attaining an elevation of at least 2,000 feet." Mr. Moore does not

Pandanus Forsteriana in having smaller and more numerous branches; shorter, more undulating and narrower leaves; cones 6 to 8 inches long, or less than half the size of those of *P. Forsteriana*; height 20 to 30 feet, with a diameter across the branches of 20 feet; the stems are about 6 inches in diameter and aerial roots are produced on the branches, a peculiarity rarely seen in *Pandanus Forsteriana.*"

Pandanus Forsteri, F.v.M., and C. Moore, was described in Mueller's *Fragm.* viii. 220 (1874), and the smaller *Pandanus* was designated *P. Moorei*, F.v.M., (name only) in Mueller's *Census*, p. 140 (1882). As far as I know, it has never been described.

Finally, Hemsley *(op. cit.)* refers to this smaller *Pandanus* as "species imperfecte cognita," and ignores Mueller's mere name.

I went to the island prepared to enquire into this *Pandanus*. I had with me as guide Edward King, who was originally Mr. Moore's guide, and who pointed the trees out to Mr. Duff. He pointed out to me the identical trees specially examined by Mr. Duff, and I have in the Museum of the Botanic Gardens a cone collected by Mr. Duff and labelled "*Pandanus Moorei*, F.v.M."

No plants on the island engaged my closer attention than did the *Pandani*. I examined them from the coast line up to 1,200 feet and endeavoured to persuade myself that there are two species, but this I failed to do. In other words, I am of opinion that there is only one species of *Pandanus* on the island, and that *P. Moorei* has no real existence. It is quite true that the cones vary in size, but not much. The cone of the so-called *Pandanus Moorei* in the Sydney Botanic Museum is unripe and consequently its dimensions are of no value. I searched the island, and the smallest *ripe* cone I could find was not much less in size than the average.

The leaves are sometimes shorter than others, but their size is not constant, even on the same tree.

In some *Pandanus* trees the "forks" or aerial roots start wholly from the stem; in the case of the reputed *P. Moorei* these aerial roots spring from the branches. I found every intermediate stage of aerial root attachment, many trees having these both

from branches and stems. I could find nothing constant in this matter. The most extreme case was said to be a tree near Soldiers' or Deep Creek (not far from Mr. Bowie Wilson's Camp), and was a tree pointed out to Mr. Duff, but I challenged my guide over and over again to show any of its characters of fruits, leaves and aerial roots constant in any part of the island.

Here and there, all over the island, up as high as I ascended (1,200 feet) I found trees with smaller cones; they were never gregarious or confined to one locality. I did my best to find out differences between *P. Forsteri* and *P. Moorei*, and have not succeeded; I brought ample material to Sydney, and examination of this has been attended by negative results.

Pandanus is universally known as Forky-tree on the island. It is not put to any use, not even the leaves. The children break open the drupes and extract the seeds, which they call "almonds," and eat them.

CYPERACEÆ.

CYPERUS HÆMATODES, *Endl.*—This coarse plant forms large tussocks in low-lying parts of the island. It is called "Cutting Grass." Its presence is not objected to as the islanders say it chokes out couch-grass and can itself be easily eradicated prior to cultivation being undertaken.

GAHNIA XANTHOCARPA, *Hook. f.*—Known as "Sword Grass."

CAREX GRACILIS, *R. Br.*—This sedge goes by the name of

there are "spikes 2, close together, or the lower at a distance of 1 to 2 lines." In my specimens 3 spikes frequently spring from the same point or one of them is scarcely below the other two (at a distance of 1 or 2 lines at the utmost). In a few cases there are 4 spikes similarly springing almost from the same point. The presence of more than two spikes naturally suggests *P. scrobiculatum*, but the shape and markings of the outer glumes is precisely that of *P. distichum*, with which it absolutely agrees in all respects saving the number of spikes in some instances. If it be considered to name it a variety on this ground, the name *anomalum* might perhaps be given.

OPLISMENUS COMPOSITUS, *Beauv.*, var. SETARIUS.—On the island they call it "Wallaby Grass" and "Dog's Medicine Grass." The origin of the latter name is obvious; that of the former not so, as there are no wallabies on the island.

PHRAGMITES COMMUNIS, *Trin.*—"Sea Cane or Reed." It is eaten down by the cattle, the stalks being sweet.

SPINIFEX HIRSUTUS, *Labill.*—Known as "Beach Grass." Used for bedding for animals and accounted the best the islanders have for the purpose.

SPOROBOLUS INDICUS, *R.Br.*—"Rat-tail" or "Tussock Grass." Said to have been introduced by Mrs. Robins 30 years ago, but I do not doubt that it was on the island years before that. The cattle crop it but it is not much esteemed.

CHLORIS PUMILIO, *R.Br.*—See Hemsley's note. This grass is recorded by Moore. I made diligent search for it but failed to find it. At the same time it is only proper to say that it was late for most grasses when I visited the island. I was, however, on the island during the same time of the year as Moore.

IMPERATA ARUNDINACEA, *Cyr.*—"Blady Grass." Not in Hemsley's List. I found a large patch near Thompson's.

I find the following in Hill's account (p. 17, folio edition, Publication No. 1 of my Bibliography):—"The grasses are couch*

* *Cynodon dactylon.*

and a tufty grass (*Sporobolus*), introduced. The former has taken possession of all the old cultivations which have been abandoned. Natural grasses are of two or three kinds, and a *Hystrix** binding the beach. I also saw one patch of blady-grass (*Imperata arundinacea*), but whether this is indigenous to the island I should think doubtful, as it was growing in the midst of the couch-grass, and may have been brought with it to that place." *Imperata* is not in Moore's lists of plants (1869 and 1871), and I was not aware of Hill's reference to *Imperata* until a few days ago. If we exclude *Cynodon*, *Sporobolus* and *Imperata* from the list of indigenous vegetation I hardly know where we should stop; certainly many have no greater claims for inclusion.

CRYPTOGAMS.

CYATHEA BREVIPINNA, *Baker*.—Hemsley says: "This is most likely the plant referred to in Mueller's list (*Fragm.* ix. 78) as *C. medullaris*, Sw." This surmise is correct. Following is a copy of a label of this plant in Mueller's handwriting: "Cyathea medullaris, Sw. var. pinnulis brevioribus et obtusioribus."

CYATHEA MACARTHURII, *F.v.M.*—This is a tree-fern with a black, prickly stem. The rhachis usually covered with a brown scurf. The pinnules dry, pale on the under side.

Tree-ferns have frequently subconical stems for 2 or 3 feet above the ground: I measured one of this species which was 70

robusta has been cultivated in the Sydney Botanic Gardens for many years and herbarium specimens have been distributed from this establishment under that name, but apparently Mr. Moore never described it.

It is very distinct from *A. australis*, and I think it should rank as a species. I would lay stress on the fact that *Alsophila* can only be satisfactorily studied from living specimens.

A. robusta grows as strong as *Cyathea medullaris* which it superficially resembles in the size, swelling and the glaucousness of the stipes and rhachises. *A. australis* is quite a weak grower in comparison.

A. australis, var. *? nigrescens* is stated by Bentham to have "stem black and prickly." *A. robusta* is not prickly, but this would apply to *Cyathea Macarthurii*. The height, "10-12 feet," is understated. I have seen them twice this height, but do not know to what height they may attain.

The peculiar glaucous appearance of the stipes and rhachises at once attracts attention. The stipes is very turgid near its place of attachment to the stem; the rhachises also are swollen and fleshy.

The prickles on the rhachis of *A. australis* are usually larger and much more abundant than on *A. robusta*, but this is not a reliable character. In *A. robusta* they are more conspicuous by reason of their dark colour on a glaucous ground.

In *A. robusta* the fronds fall off and leave a scar. Not so *A. australis* as a rule, in which the dead fronds have to be cut off, leaving the bases of the old fronds attached right up the trunk.

In *A. robusta* the pinnules are more fleshy and more crowded together than in *A. australis*. In *A. robusta* they always overlap the rhachis.

The pinnæ are from 30-40 in *A. robusta* and usually 20-30 in *A. australis*.

We have no evidence that this fern is found anywhere else than in Lord Howe Island.

TRICHOMANES APIIFOLIUM, *Presl.*—Known as "Parsley Fern."

TRICHOMANES JAVANICUM, *Blume.*—I received this fern from Mr. Robert Etheridge, Curator of the Australian Museum. It was collected by himself and Mr. Thomas Whitelegge on their visit to the island in 1887. Locality, Soldiers' or Deep Creek. It is not in Hemsley's list, and is therefore an addition to the flora of the island.

ASPLENIUM ROBINSONII, *F.v.M.*—"Crimpy Bird's Nest Fern." Hitherto only recorded from Norfolk Island, has been found by Edward King on Mt. Gower in a locality that need not be more definitely indicated for the present. This is a remarkable fern, so much sought after in Norfolk Island that it has been almost exterminated. King, who is the collector for the Botanic Gardens, informed me that he collected three and lost them by the swamping of his boat. I have not seen the fern from Lord Howe Island, but include it on his authority as he is a reliable man and knows the Norfolk Island fern well.

ASPLENIUM OBTUSATUM, *Forst.*, var. LUCIDUM, *Benth.*—Hemsley (perhaps through inadvertence) appears only to take cognizance of var. *incisum*, but Bentham (B. Fl. vii. 747) also records var. *lucidum*, of which I collected specimens.

ASPLENIUM PTERIDIOIDES, *Baker.*—"Celery Fern."

ASPIDIUM ACULEATUM, *Sw.*, var. MOOREI, *Christ.*—Specimens of a fern from rocks on the east side of Mt. Lidgbird received

Reef (mouth of Soldiers' or Deep Creek). The identical spot was the rocks in the foreground of the photograph entitled "Mount Gower from the Camp," facing page 18 of *Wils. Rep.* The same rocks are figured at Plate vii. of Etheridge's Report (Australian Museum, Memoir 2) 1889. When I showed King the fern he professed to know it and called it "Crimp Fern." It is an addition to Hemsley's list.

I propose to postpone consideration of the Mosses, Lichens, Fungi and Algæ of Lord Howe Island for the present.

Timber-trees.—The Hon. Bowie Wilson in his Report, dated 17th April, 1882, states (p. 2): "None of the timber growing on the island is of any value for industrial, economic or commercial purposes, &c." This is a very sweeping statement, but even yet we know but little about the timbers. The experience of the islanders in regard to them is confined to those growing below 800 feet. No timber will last longer than 12 months in the coral sandy soil; in muddy holes in stiff soil, yellow wood (*Acronychia*, &c.) is very durable, and it is believed will last a life-time.

Herewith is a list of the trees of say 30 feet and upwards in height, and hence including all those which can form the timber-supply of the islanders. A few others may be included after I have made a further visit to the island.

Lagunaria Patersoni, G. Don.
Melicope contermina, C.M. et F.v.M.
Zanthoxylon Blackburnia, F.v.M.
Acronychia Baueri, Schott.
Dysoxylon Fraseranum, Benth.
Elæodendron curtipendulum, Endl.
Cupania Howeana, Maiden.
Sophora tetraptera, J. Mill.
Acicalyptus Fullagari, F.v.M.
Panax cissodendron, C.M. et F.v.M.
Randia stipulosa, C.M. et F.v.M.
Dracophyllum Fitzgeraldi, F.v.M.
Sideroxylon Howeanum, F.v.M.

Blue Plum.
Symplocos Stawelli, F.v.M.
Olea paniculata, R.Br.
Myoporum insulare, R.Br.
Cryptocarya triplinervis, R.Br.
Hemicyclia australasica, Muell. Arg.
Baloghia lucida, R.Br.
Ficus columnaris, F.v.M. et C.M.
Hedyscepe Canterburyana, Wendl. et Drude.
Howea (Kentia) Belmoreana, Becc.
Howea (Kentia) Forsteriana, Becc.
Pandanus Forsteri, C.M. et F.v.M.
Black Plum.

INTRODUCED WEEDS

(INCLUDING SOME USEFUL ONES).

Although Mr. Hemsley's list is an enumeration of all the "indigenous" plants known to inhabit the island, he has seen fit to include therein certain introduced plants; perhaps it would be desirable to exclude these, and to place them in a separate list Unless this be done there will be no finality in a list of the flora, one reason being that weeds are sometimes exterminated by human agency, a circumstance as yet unknown with any species

I think the following plants in Hemsley's list were probably introduced by the hand of man during the present century:—*Oxalis corniculata*, Linn., *Bidens pilosa*, Linn., *Panicum sanguinale*, Linn. To these I might perhaps add *Solanum nigrum*.

I now propose to add notes on some weeds collected by me, indicating whether they have been previously recorded or not, and giving some notes of more or less interest in regard to them, just as I have done in the case of introduced plants.

CRUCIFERÆ.

SENEBIERA DIDYMA, *Pers.*—Abundant. Recorded originally by Moore.

CARYOPHYLLEÆ.

CERASTIUM VULGATUM, *Linn.*—A Chickweed (Mouse-ear) not recorded.

POLYCARPON TETRAPHYLLUM, *Loefl.*—Abundant. Not recorded.

PORTULACA OLERACEA, *Linn.*—"Pig-weed" or "Purslane." Not recorded. So abundant in some places as to be used with sweet potato vines for pig-feed.

LEGUMINOSÆ.

MEDICAGO DENTICULATA, *Willd.*—Not recorded. Plentiful. Not a noxious weed, as there are no sheep on the island; at certain seasons it is a useful fodder plant. At the same time it is often a nuisance in gardens and other cultivation patches.

VICIA SATIVA, *Linn.*—"Vetch." Not recorded. Several patches in the long grass close to the beach near Thompson's landing-place.

CASSIA LÆVIGATA, *Willd.*—Not recorded. I observed a thicket of this at the back of Mrs. T. Nicholls' ground. It goes by the ridiculous name of "Myrtle" on Norfolk Island, where it became such a pest that a regulation was adopted under which it was exterminated. I strongly urged its eradication in Lord Howe Island.

COMPOSITÆ.

ERIGERON LINIFOLIUS, *DC.*—"Cobbler's Pegs." Not recorded Abundant at the present time.

BIDENS PILOSA, *Linn.*—No. 59 in Hemsley's list. Very abundant, and locally known as "Teaser" for obvious reasons. It was brought with potatoes by whalers from Sunday Island, Macaulay Group, near New Zealand.

TARAXACUM DENS-LEONIS, *Desf.*—"Dandelion." Not recorded. A note in regard to this plant has been given at p. 154.

SOLANACEÆ.

SOLANUM NIGRUM, *Linn.*—Not recorded. Springs up wherever land is cleared. It is known as "Black Currant," the fruits being occasionally used for jam, as on the mainland.

SOLANUM AVICULARE, *Forst.*—No. 86 in Hemsley's list. Known as "Bully-bully" (said to be the Maori name). "Kangaroo Apple." Mrs. T. Nicholls says she has seen the Maoris eat the fruits, but Europeans could not.

PHYSALIS PERUVIANA, *Linn.*—"Cape Gooseberry." Springs up in many places where land is cleared. Not in Hemsley's list.

VERBENACEÆ.

VERBENA BONARIENSIS, *Linn.*—Recorded by Moore. Known

EUPHORBIACEÆ.

RICINUS COMMUNIS, *Willd.*—"Castor Oil Plant." Introduced to the island by Dr. Foulis, who employed it for medicinal purposes. It is now a great nuisance, as it is spreading in the brushes and injuring the native vegetation. Cattle keep it down in most places where they can get at it. Already noted by Moore.

GRAMINEÆ.

CERATOCHLOA UNIOLOIDES, *DC.*—"Prairie Grass." Not recorded. This useful grass was originally introduced (by seed) several years ago; it is now well established in many parts of the island.

STENOTAPHRUM AMERICANUM, *Schrank.* — "Buffalo Grass." Introduced by Mrs. Cavaye about five years ago, and spreading.

AVENA SP.—"A bearded Wild Oat." Said to be plentiful, and described to me clearly by two witnesses. I did not see it, at all events in flower or grain.

EDIBLE INTRODUCED FRUITS.

Following are on the island up to the present time :—

Apples, an eating and a cooking.

Pear, cooking.

Quince.

Peaches.

Plum (Black Diamond).

Apricots.

Loquats (these and many other fruit trees were received viâ Norfolk Island).

Orange, of which there are some magnificent trees on Mrs. T. Nicholls' land of great size, in full bearing, and without a trace of disease, as far as I could see. They were introduced by Mr. Andrews (Mrs. Nicholls' father) about 1860 from Tahiti, pips having been planted on board the American whaler "Napoleon." This was the beginning of Citrus cultivation in Lord Howe Island.

In addition there are other Orange trees, also Seville Oranges, Mandarin Oranges and Lemons; also one Lime and one Citron.

Strawberries have been tried and have been exterminated by birds.

Mulberry, the edible one; also the White Mulberry for silk-worms.

Turkey Fig.

Cape Gooseberry, introduced by a Mr. Hastnett, and now a weed.

Pomegranate.

Pea-nut *(Arachis)*.

Passion-fruit.

Cherimoyer apparently flourishes, but it is a shy fruiter.

Grape-vine (Black Hamburgh and Muscatel), does not flourish here; the climate is too wet. The islanders allow them to grow prostrate.

Yellow Guava, from Tahiti, viâ Norfolk Island.

Black or Purple Guava.

Bananas were originally introduced by Dr. Foulis, and are one of the staples of the island. They grow the Cavendish, Plantain and Sugar Banana.

Pine-apple exists, but does not flourish.

Papaw *(Carica Papaya)*. There are several plants on the island, and they are universally known as Mammee Apple, usually

time in the tropics, ought to know it, but a handsome young tree in front of Mrs. T. Nicholls' house which goes under this name is Candle-nut tree *(Aleurites triloba)*.

Date Palms have not flowered yet.

Coco-nut Palm fails.

I have introduced the Olive into the island; it should do well.

VEGETABLES, AND MISCELLANEOUS FOOD-CROPS.

All sorts of vegetables are known or have been grown in the island. The islanders only get one crop (a winter one) of cabbages, cauliflowers and other cruciferous vegetables, because of the prevalence of aphis.

Lord Howe onions are celebrated in the southern hemisphere. At one time they formed the staple of the island, but the prevalence of smut has severely damaged the industry. They grow a small pickling onion and a larger sort. These onions have excellent keeping qualities. The industry commenced about fifty years ago through the finding on the beach (by Mrs. Andrews) of two or three onions which had been thrown overboard from a passing vessel.

Sweet potatoes are very largely grown, and pigs are principally fed on the vines. Yams are grown to a less extent.

The mountain Taro of Fiji has been received viâ New Zealand, and was rather largely grown at one time, but it is not cultivated now. The same remarks apply to the Onion Arrowroot *(sic)* of Fiji (? *Tacca*). Two kinds of Arrowroot are still grown on the island, viz, what they call "Indian Shot Arrowroot" *(Canna)* and "Potato Arrowroot."

Mr. Henry Wilkinson in his Report (p. 20) speaks of "Sago," but I observed none.

Sugar cane is grown for pigs, and is also eaten by youngsters.

Chocho *(Sechium edule)* is also on the island, but does not appear to be esteemed.

SOME MISCELLANEOUS INTRODUCED PLANTS (CHIEFLY ECONOMIC).

Coffee—There are two kinds, one from Norfolk Island and the other from the Sydney Botanic Gardens. The plant flourishes in the sandy soil.

Tea has failed, the island being too windy.

Ginger has been grown by Mr. Edward King from rhizomes brought from Fiji, but is now extinct.

Capsicum frutescens, Linn.—"Bird's Eye Pepper," from Fiji, also Chillies are grown.

Tobacco grows like a weed, but is not utilised.

Aleurites triloba, Forst. (Candle Nut).—There is a young tree of 8 or 10 feet in front of Mrs. T. Nicholls' house. Erroneously called "Bread-fruit."

Aloe sp. (Blue Aloe).—This Aloe is abundant. It was introduced by Dr. Foulis for medicinal purposes, it is said. I brought a plant over for cultivation in order to determine the species.

Musa textilis, Nees. (Fibre banana or Manilla hemp).—Has been tried, but it grew too tall and the wind destroyed it.

Cotton.—There is too much wind for this fibre-plant, the cotton being blown out of the capsules

Sorghum is grown for pig-feed. Considerable quantities of maize are grown; there are also patches of lucerne.

Teosinte (*Euchlaena luxurians*).—I noticed a few plants of

Gaillardia picta, Sweet.—This garden plant is an escape near the Old Settlement, and has extensively spread in the grass-land, for about 2 acres.

Acalypha Wilkesiana, Muell. Arg.—Fine plants from Fiji in several gardens.

I introduced into the island last month (May) the following plants (amongst others), most of which do not appear to have been tried on the island. Some of them are intended to be tested as regards their power of resistance to the wind :—

Pinus insignis, P. pinea, Grevillea robusta, Laurus camphora, Quercus virens, Q. suber, Olea europea, Schinus molle, Tristania conferta, Ligustrum lucidum, Pittosporum eugenioides, Escallonia montevidiensis.

SOME LORD HOWE ISLAND DISHES.

Following are some dishes more or less used by the islanders :—

1. "Pill-eye." A bucketful of grated sweet potato to a saucer of flour, and admixed with a little fat. Baked in an oven like a loaf of bread.

2. Green bananas boiled in their skins; a substitute for potatoes. A Norfolk Island dish.

3. Pudding made of ground corn (maize) and ripe bananas.

4. Heart of Palm-tree *(Kentia)* was boiled as a vegetable in former times. It tastes like a cabbage stump. They more strictly conserve the palms now.

5. Sow Thistle and Purslane were formerly much used as a substitute for cabbage; they are used to a small extent now.

6. Taro leaves are eaten, although they are rather slimy; sweet potato leaves are likewise used as cabbage-substitutes.

7. Mutton-birds and their eggs are largely used for food in the proper season, so also are the eggs of the Wide-a-wake and Gannet. Mutton-bird fat is used by some for cooking, but it has a fishy taste.

SUMMARY OF RESULTS.

As already stated, I have taken Hemsley's Flora as a basis, and following is a list of the species enumerated in my list to which I especially invite attention.

Additions to the Indigenous Flora.

Cakile maritima, Scop.; *Cupania Howeana*, **Maiden**, n.sp.: *Elæodendron curtipendulum*, Endl., (also in Norfolk Island); *Cotula australis*, Hook. f.; *Sonchus oleraceus*, Linn.; *Plectranthus parviflorus*, Willd.; *Salicornia australis*, Sol.; *Rumex Brownii*, Campd.; *Paspalum distichum*, Linn., (the inflorescence sometimes with three, and occasionally with four spikes); *Imperata arundinacea*, Cyr.; *Alsophila robusta*, C. Moore, (in lieu of *A. australis*, R.Br., var. *? nigrescens*, Benth.); *Trichomanes javanicum*, Blume (collected by Etheridge and Whitelegge); *Asplenium Robinsonii*, F.v.M., (reported by King, but specimens not seen by me; also in Norfolk Island); *Asplenium obtusatum*, Forst., var. *lucidum*, Benth.; *Aspidium aculeatum*, Sw., var. *Moorei*, Christ, (has perhaps, in some instances, been mistaken for a dwarf form of *A. capense*, Willd.); and genera ? (Blue Plum, and Black Plum).

Introduced Plants (additions).

SUPPOSED INDIGENOUS PLANTS (REMOVALS FROM HEMSLEY'S LIST).

Calophyllum inophyllum, Linn.; *Elæodendron australe*, Vent.; *Elæodendron melanocarpum*, F.v.M., (these two species were recorded through confusion with *E. curtipendulum*, Endl.); *Cupania anacardioides*, A. Rich.; *Cupania semiglauca*, F.v.M., (these two species were recorded from imperfect material, and are to be referred to *C. Howeana*, Maiden).

INDIGENOUS SPECIES MARKED DOUBTFUL IN HEMSLEY'S LIST, BUT DOUBTS NOW REMOVED.

Lepidium foliosum, Desv., (confirmed); *Pandanus* (species imperfecte cognita) removed from list as having no distinct existence; *Chloris pumilio*, R.Br., (recommended to be removed).

Hemsley records 206 plants and three introduced ones, total 209. I have added 16 species and one named variety to the indigenous flora, and 17 species of introduced plants, while I have removed five species of supposed indigenous plants from Hemsley's list, as the records were based on erroneous information. So that, according to my paper, the flora of Lord Howe Island stands at present at 217 indigenous species, (being a net addition of 11), and 20 introduced ones.

REFERENCE TO PLATES.

(Plate I.)

Cupania Howeana.

Fig. 1.—Twig, with leaflets, flowers and fruit (some leaflets removed; the lower leaflets often broader).
Fig. 2.—Flower expanded (mag.).
Fig. 3.—Sepal (mag.).
Fig. 4.—Petal (mag.).
Fig. 5.—Stamens and ovarium (mag.).
Fig. 6.—Stamens, top and bottom view (mag.).
Fig. 7.—Fruit, the valves open (nat. size).
Fig. 8.—Fruit, top view (nat. size).
Fig. 9.—Seed, showing funicle, also remains of arillus.
Fig. 10.—Seed (arillus removed), nat. size.
Fig. 11.—Embryo, slightly enlarged.

(Plate II.)

Blue Plum.

Fig. 1.—Fruit. The shape varies from that shown to egg-shaped and oval
Fig. 2.—Endocarp.
Fig. 3.—Endocarp, showing suture.
Fig. 4.—One cotyledon, showing embryo.
(All nat. size.)

(Plate III.)

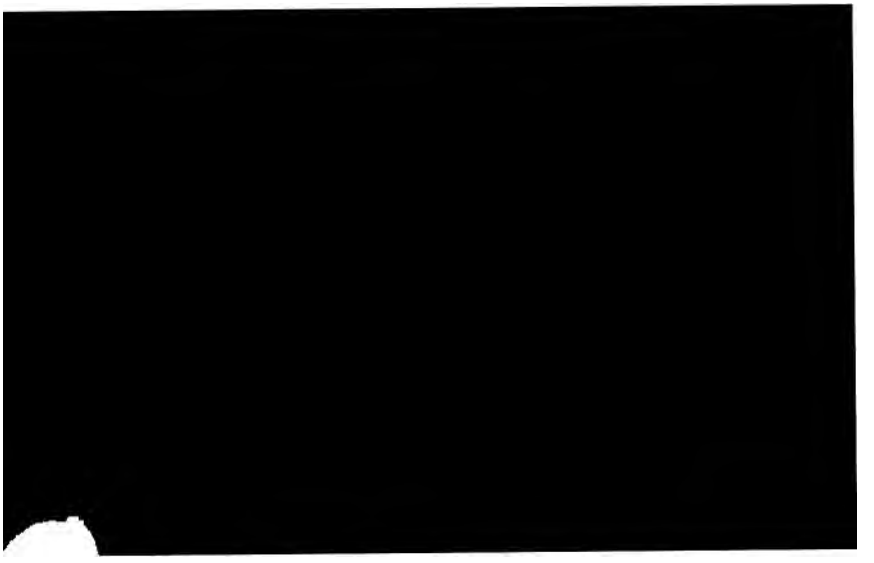
Black Plum.

Fig. 1.—Leaf.
Fig. 2.—Fruit. This is a faithful reproduction of a somewhat dried specimen. When perfectly fresh the fruit is slightly larger and scarcely exhibits externally the separation of the cotyledons.
Fig. 3.—Cotyledons.
Fig. 4.—Single cotyledon, showing embryo.
Fig. 5.—Embryo.
Fig. 6.—Longitudinal section and embryo.
(Figs. 5 and 6, much enlarged; 1-4, nat. size.)

(Plate IV.)

Hedyscepe Canterburyana.

Fig. 1.—Top of ripe spatha, showing parallel markings (nat. size).
Fig. 2.—Outline of an immature spatha, showing scurf along portion of the margin, also (by shading) the immature inflorescence enclosed.



NOTES ON *STERCULIA (BRACHYCHITON) LURIDA* AND *DISCOLOR.*

By J. H. Maiden and E. Betche.

In a recent revision of the genus *Brachychiton*, Prof. A. Terracino* reduces the ten species given in Bentham's *Flora Australiensis* to four, retaining in most cases the names of the *Flora* as varieties (see p. 160). We have not sufficient herbarium material of the Queensland species to express an opinion as to the correctness of all these reductions, but with regard to *S. lurida* and *discolor* our own observations coincide completely with those of Prof. Terracino, and we propose to unite them under Baron v. Mueller's name *discolor*. The only difference indicated in the *Flora Australiensis* is in the leaves, which are "angular and very shortly and irregularly 5- or 7-lobed and white underneath, with a very close tomentum" in *S. discolor*, and "deeply 5- or 7-lobed and pubescent underneath but not white" in *S. lurida*. The flowers and fruits appear to be exactly the same in both species. The difference in the leaves in the two extreme forms is so great that nothing short of the fact that we have seen both forms of leaves growing on the same tree could induce us to adopt Prof. Terracino's view of uniting the two species.

The tall trees of *S. lurida* in the Sydney Botanic Gardens are about 40 years old, and were probably planted shortly after Mr. Moore's discovery of the species in 1858, from seeds or young seedling plants brought by him from the original locality (Clarence River). All these old trees have now either completely changed

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* Le specie de genere Brachychiton. *Bolletino del R. Orto Botanico di Palermo.* Anno 1. Fasc. ii. 1897.

into *S. discolor* or bear leaves of both forms, while young trees, raised from seeds of these trees, preserve completely the character of *S. lurida*. From the above we can only draw the conclusion that *S. lurida* is only the young* state of *S. discolor*, and cannot even rank as a distinct variety, much less as a species.

Observations have been made only on cultivated plants; we invite observations made on plants in their natural habitats. We propound the following question :—

Have *young* plants of *S. discolor* ever been noticed with the foliage characteristic of this species (leaves angled or shortly lobed and white underneath) ?

The two plants grow in the same situations; they were first collected together (by Moore) and described together (by Mueller, *Fragm.*, i. i. 1858).

B. discolor : foliis subcoriaceis, breviter 5-7-lobis, supra glabris, subtus tenuiter cinerascenti-velutinis. See also *Bot. Mag.* t. 6608.

B. luridum : foliis profunde quinquefidis herbaceis fere concoloribus parce pubescentibus. See also *Fragm.* ii. 177.

We are keeping the other species of *Sterculia* under observation.

Following is Prof. Terracino's suggested arrangement compared with those by Mueller and Bentham :—

A. TERRACINO.	F. v. M.'s CENSUS.	BENTH. FL. AUSTR. (AS *Sterculia*.)
B. paradoxus, Sch. & Endl.		

A. Terracino.	F. v. M.'s Census.	Benth. Fl. Austr. (as *Sterculia*.)
B. australis, Schott.		
a. typicus	*B. platanoides*, R.Br.	*S. trichosiphon*, Benth.
β. (?) *incanus*	*B. incanus*, R.Br.	*S. incana*, Benth.
B. diversifolius, G. Don.		
a. typicus	*B. populneus*, R.Br.	*S. diversifolia*, G. Don.
β. caudatus	*B. diversifolius*, R.Br.	*S. caudata*, Hew.
Hybrid: *populneo* × *acerifolius*	*B. populneo-acerifolius*, F.v.M.	
B. rupestris, Lindl.	*B. Delabechii*, F.v.M.	*S. rupestris*, Benth.

ON TWO WELL-KNOWN BUT HITHERTO UNDESCRIBED SPECIES OF EUCALYPTUS.

By R. T. Baker, F.L.S., Assistant Curator, Technological Museum, Sydney.

In a paper "On the occurrence of *Eucalyptus pulverulenta* in Victoria," read by Mr. A. W. Howitt, F.G.S., before the A.A.A.S. recently held in Sydney, an opinion is expressed that the *E. Stuartiana* figured and described by Baron von Mueller in his Eucalyptographia is a "strong variety of *E. pulverulenta*."

As I am familiar with the tree which has always been regarded in N.S.W. as *E. Stuartiana* and failed to see any connection between it and *E. pulverulenta*, I wrote Mr. Howitt stating my grounds of objection to his classification. I immediately received from him complete material of all Victorian species in dispute; specimens of timber, bark, foliage (young and mature), buds, fruits and also a quantity of leaves—enough to give sufficient oil for a chemical investigation.

From the information accompanying each it was clear that my correspondent was able to speak with confidence concerning these particular Eucalypts, for in one of his letters he states :—

"The leaves I sent were of the tree which Baron von Mueller selected and established in the Eucalyptographia as *Eucalyptus*

'White Box' of Gippsland and the north-eastern districts. It seems indistinguishable from the trees which are very common in N.E. Gippsland (Snowy River). Unfortunately Baron von Mueller joined this with his *E. Stuartiana*. In my eye the two are so distinct that they should be separated, and to make the confusion worse he has attached the aboriginal (Gippsland) name 'But But' to *E. Stuartiana*, whereas it belongs to 'Woolly-butt.'"

As Mr. Howitt was a co-worker with the Baron on the Eucalypts of Victoria and so is familiar with the actual individual trees, of which the parts are described and figured in the Eucalyptographia, his remarks must necessarily carry great weight.

After much correspondence and comparing our specimens and notes, we have summarised our results as follows:—

(*a*) *E. pulverulenta*, Sims, does occur in Victoria, but in a *lanceolate-leaf* form as recorded by Mr. Howitt (A.A.A.S. 1898).

I have now to record the occurrence of this variety in N.S.W. at Barber's Creek (H. Rumsey).

(*b*) *E. Stuartiana*, F.v.M., as figured and described by Baron von Mueller in his Eucalyptographia, is distinct from *E. pulverulenta*, Sims, and the var. *lanceolata*, A.W.H., as well as from the New South Wales "Apple," "Apple-topped Box," "Woolly-butt," "Bastard Box" (*E. Bridgesiana*, sp.nov.) and the Victorian "But But."

The bark and timber of *E. Stuartiana*, F.v.M., very much resemble those of *E. pulverulenta*, but the young and mature leaves, buds, fruits, and oil are quite distinct.

(*c*) The Victorian "But But" and New South Wales "Apple," "Apple-topped Box," "Woolly-butt," "Bastard Box," are one and the same species, and, as far as we are aware, undescribed. The name *E. Bridgesiana* is now proposed for it.

(*d*) "Yellow Gum" is also an undescribed species. In Bentham's Flora Australiensis, Vol. iii. p. 244, under *E. Stuartiana* var. *longifolia* a brief description is given of "Yellow or Grey Gum," and "Bastard Box," (Woolls), Twofold Bay.

This variety is referred to by Dr. Woolls in his "A Contribution to the Flora of Australia," p. 230, published after the above work, and as he collected the specimens of "Yellow Gum," he would be well acquainted with this tree "of the Wingecarribee." After mentioning this and "Bastard Box," he states: "It seems highly probable that under the name of *E. Stuartiana* two distinct species are included, which hereafter must be referred to separate sections."

Mueller refers this var. (Eucalyptographia, Dec. 4) to *E. punctata*, but it will be shown later that it does not belong to that species.

It would appear from our deductions that three species and one variety have been included under *E. Stuartiana*.

E. BRIDGESIANA, sp.nov.

"Apple," "Apple-topped Box," "Woolly-butt," of New South Wales. "But-but" of Gippsland, Victoria.

"A tree of considerable size" (Woolls); "grows to a great height, particularly in loamy soil" (J. Manns). Bark whitish-grey, wrinkled or tessellated, short and brittle in the grain, not fibrous, almost exactly identical with the Box, *E. hemiphloia*, when freshly cut giving out an aroma similar to the ordinary oil obtained from Eucalyptus leaves, extending almost to the ultimate branchlets.

or acuminate. Stamens inflected in the bud, roof of ovary flat or curved. Anthers oblong, parallel, opening with longitudinal slits, connective small.

Fruits hemispherical, rarely conical, 3 to 4 lines in diameter, on a short pedicel, sessile when conical, rim mostly thickened with a ring below the edge; a specimen from Araluen has quite a flange. Valves exserted.

Hab.—VICTORIA: Gippsland ("But But," "Apple-tree," "Apple-tree Box," "White Box," *A. W. Howitt, F.G.S.*). N.S. WALES: Colombo ("Apple-top Box," *W. Bäuerlen*); Albury ("Apple," *Dr. Andrews*); Gerogery ("Woolly-butt," *J. Mann*); Rylstone ("Woolly-butt," *R.T.B.*); Bathurst ("Bastard Box," *W. Woolls*).

If this species were classified on its bark and timber alone, it would be placed between the ordinary "Box," *E. hemiphloia*, F.v.M., and "White Box," *E. albens*, but these belong to the Porantheræ division of Eucalypts, whilst the anthers of this species are parallel and open by longitudinal slits, and it therefore comes in the Parallelantheræ series.

The hemispherical-shaped fruits connect it with *E. viminalis*, Labill.; in fact it is impossible to determine the two species from fruits alone, and in one instance the young leaves of each species very similar. It differs, however, from this latter species in its timber, and particularly in its bark (not that much reliance can be placed in cortical features in working out specific distinctions), but in this case we have the only instance recorded of a Eucalyptus bark yielding an oil! This in itself is, I think, sufficient to establish its specific rank. The oil from the leaves is quite distinct in quality and quantity from *E. viminalis* oil.

I should not be surprised if the "Woolly-butt" recorded under *E. viminalis*, B.Fl. iii. p. 240, were also this species.

Unfortunately I have not been able to obtain timber and bark of *E. alba*, Reinw., but from published descriptions of that species I feel disposed to think that these two parts of the respective trees much resemble each other. The leaves of both are distinct.

As it has fruits and mature leaves similar to *E. viminalis* and probably bark and timber of *E. alba*, I place it in botanical sequence between these two species.

As the "But But" of Gippsland, Baron von Mueller included it in his *E. Stuartiana*, but his description does not apply to it, and as proved to me by the specimens and other evidence of Mr. Howitt, the Baron was not at all familiar with the Gippsland tree and described his species from trees growing at Croydon, 10 miles from Melbourne.

It differs from the Baron's *E. Stuartiana* in—(*a*) Its usually petiolate, ovate-acuminate young leaves; (*b*) its longer buds, larger and petiolate fruits, and obtuse operculum; (*c*) its whitish-grey oil-containing "box" bark; (*d*) its whitish hard timber, and habit. If bark and timber count for anything, the two trees should be separated on these characters alone

Timber.—It is a fairly hard, whitish-brown timber, but it is only good for indoor work as it decays rapidly when exposed to the air or placed in the ground. It is not used where strength and durability are required; fairly good for fuel.

Oil.—(*a*) *Leaves.*—646 lbs. of leaves with branchlets, distilled Feb., 1898, gave 59 ounces of oil, or an average of ·571 per cent., a very satisfactory result. The oil is a little red in colour, and a few preliminary tests indicate it to be a good oil.

(*b*) *Bark.*—This bark has an odour when fresh and attracts

Eucalyptus tree, as far as we are aware, that is likely to give an essential oil from its bark.

The dedication of this species is to Mr. F. Bridges, Chief Inspector of the Department of Public Instruction of this Colony, and who was the first Superintendent of Technical Education, in in which capacity he was (and even now is) most zealous in promoting the application of economic science to our indigenous vegetable products.

EUCALYPTUS PALUDOSA, sp.nov.

(*E. Stuartiana*, F.v.M., var. *longifolia*, Benth., B.Fl. iii. p. 244). "Manna," "Yellow," "Ribbony," "Swamp," or "Flooded Gum."

A tree "not exceeding 80 feet in height" (Sir W. Macarthur), with a diameter 6 feet from the ground 1ft. 6in. to 2 feet. In the young state up to a trunk of 5 to 6 inches it is very similar to *E. viminalis*, Labill. Bark brown at the butt, bluish-white on the trunk and main branches, and yellow on the smaller branches and limbs, decorticating into long ribbons of 30 feet or more suspended from the forks and trunks of the trees.

The lower young leaves opposite, sessile, ovate-acuminate, rarely cordate; the upper ones petiolate, irregularly opposite, lanceolate, venation distinct, oil-glands numerous, coriaceous, often shining and of a yellowish-green on both sides. Mature leaves on petioles rarely exceeding an inch, lanceolate-acuminate, varying in length up to 8 or 9 inches, coriaceous, lateral veins oblique, fairly numerous and equally prominent on both sides, but in some instances scarcely visible, the intramarginal vein removed from the edge in the broader leaves, but closer in the narrower ones, slightly shining on both sides, oil-glands not numerous, drying with a yellowish tinge.

Peduncles axillary, under ½ inch long, flattened, with 7 to 10 sessile flowers. Calyx tube 3 lines long. Operculum conical, shortly acuminate, much shorter than the calyx-tube. Stamens inflected in the bud. Anthers oblong, with parallel cells, the connective about half their length and prominent on both sides.

Ovary half the length of the bud, placenta attached to the top and bottom of the ovary.

Fruit sessile, conical, truncate, with a ring just below the rim, 3- or 4-celled, valves not exserted.

Hab.— Monga (Braidwood, *W. Bäuerlen*); Delegate (Bombala, *W. Bäuerlen*); Wingecarribee (*W. Woolls*); Hill Top (*J. H. Maiden*); Barber's Creek (*H. Rumsey*).

Under *E. Stuartiana*, F.v.M., (B.Fl. iii. p. 244) Bentham gives a variety *longifolia*, which Baron von Mueller states in his Eucalyptographia, Dec. 4, belongs to *E. punctata*, "Grey Gum." Now this latter species occurs throughout nearly the whole of the coastal area of this colony, and also at the same spot from which the material was obtained on which this new species is founded, and as I believe I am familiar with all the known varietal forms of *E. punctata*, I cannot admit that this species is a variety of "Grey Gum." In a paper read before the Roy. Soc. N.S.W. Vol. xxxi. 1897, by myself and colleague, Mr. H. G. Smith, "on *E. punctata*, particularly in regard to its essential oil," the systematic botany was fully treated, and I endeavoured to bring this species under one of its varietal forms but could not, as in so many of its physical properties it stood quite alone, and so I decided to give it specific rank.

In botanical sequence this species should probably come between *E. saligna*, Sm., and *E. punctata*, DC., of Baron Mueller's classifi-

E. Stuartiana, I should have considered them one and the same species, although there is a slight difference in the fruits of each; Mueller's species having exserted valves, and also a thicker rim.

It differs from *E. saligna*, Sm., in the venation and texture of its leaves, also in the shape of its fruits and constituents of its oil, but has some resemblance to it in the colour of its wood and nature of bark and its natural habitat, and these three characters also connect it with *E. punctata*, DC., the species under which it was placed by Baron von Mueller. It is, however, well removed from that species by the shape of the fruits, young leaves and its coriaceous mature leaves, which are almost devoid of oil-glands,—the oil obtained being therefore much less in quantity than that of *E. punctata*, and the quality of the oil is also much below that of "Grey Gum," which has been shown (*loc. cit.*) to surpass in quality and quantity the world-renowned *E. globulus*, Labill. "Grey Gum" timber is also more highly valued than that of "Yellow Gum."

It differs from *E. Gunnii* of Hooker, f., in Fl. Tas. i. 134, t. 27, in its larger, shining, acuminate young leaves; in its prominent venation, and coriaceous leaves; in its turbinate or conical sessile fruits, with slightly exserted valves, in the absence of a glaucousness on the fruits, branches, leaves and twigs, cider exudation, quality of timber, and constituents of its oil.

The leaves of *E. Gunnii* are eaten by stock and, therefore, classed as a fodder (Mueller, Eucalyptographia, Dec. 4), but the leaves of this species could not be put in this category as the volatile oil is too pronounced, as also are the tans. Some experiments were undertaken, but cattle could not be tempted to eat the leaves, preferring even bark and bones.

The "Yellow Gum" referred to by Baron von Mueller (*loc. cit.*) is without doubt this species. I have examined complete material of *E. Gunnii*, Hook. f., and "Yellow Gum" from the same locality (Bombala), and except that the young leaves of the latter are petiolate, it agrees in every other respect with the "Yellow Gum" of the Wingecarribee of Woolls and my specimens from Barber's Creek, and so is quite distinct from Hooker's *E. Gunnii*,

and I have, therefore, decided to include this southern variety of "Yellow Gum" in this species.

One is very reluctant to dissent from the Baron's classification, but his placing the "Yellow Gum" (Woolls) under *E. punctata*, DC. (*loc. cit.*), appears to me sufficient evidence that he was not quite acquainted with the characteristic differences and habits of the living trees.

Although often found growing intermixed with *E. viminalis*, yet the two species are never confused, as each has its own distinctive facies; and they differ in the fruits, timber, and oil.

Timber.—The timber is much more difficult to season than that of *E. Gunnii*, Hook., and is also specifically heavier. It is a close-grained, hard timber of a light reddish colour, and I should consider it a much more durable timber than *E. Gunnii* or *E. viminalis*. Sir W. Macarthur states that it is "said to be good." Dr. Woolls was of opinion that it is not suitable for any purpose, but Mr. H. Rumsey, of Barber's Creek, informs me that sound logs will last 30 years in the ground. My own opinion is that if well seasoned it is a good, sound, hard, durable timber, and useful for many purposes.

Oil.—The leaves are not rich in essential oil, as 394 lbs. of leaves with terminal branchlets, distilled June, 1898, gave 15 oz., or ·243 %. It is slightly red in colour, and is probably (from preliminary tests) not a good oil, and as the yield is not good it

E. paludosa, sp.nov.

Figs. 1-2.—Young leaves.
Fig. 3.—Ultimate twig with peduncles.
Fig. 4.—Section of bud } enlarged.
Fig. 6.—Anther }
Fig. 6.—Cluster and individual fruits.

DESCRIPTIONS OF SOME APPARENTLY COMMON AUSTRALIAN NEMATODES FOUND AT SYDNEY OR IN PORT JACKSON.

By N. A. Cobb, Ph.D.

(Publication deferred.)

NOTES AND EXHIBITS.

Mr. Henry Deane forwarded for exhibition portion of an old Eucalypt stump, which was unearthed about three weeks ago in George Street, opposite the new Markets, during the excavations for the tramway now in course of construction. The exhibit is of interest as a relic of what was no doubt the old vegetation of the locality at the time of the foundation of the colony.

Mr. Froggatt exhibited a stone from an orchard near Sydney so thickly covered with the eggs of a minute red mite as to resemble a lichen at first sight. Also a curious undetermined fungoid growth upon grass, for which he was indebted to Mr. Allan, of Wingham, Manning River.

Mr. Rainbow contributed the following

Note on *Argyrodes antipodiana*, Cambr.

This species, *Argyrodes antipodiana*, a specimen of which is exhibited, is found both in New South Wales and New Zealand. According to Cambridge,* it very closely resembles *A. argentata*, Cambr., both in general appearance, colours and markings, and in respect of its abdomen, *A. epeiræ*, Simon. All the spiders of this genus are remarkable for their brilliancy, and many of them,

Mr. W. S. Dun exhibited two fossils shells from the Narrabeen Beds, near Newport. One, collected by Mr. W. Willcox, belongs to one of the extreme genera of the fossil *Unionidæ*, occurring in the newer Palæozoic and older Mesozoic Rocks. The left valve only is preserved, and is somewhat distorted. It is 13 mm. long and 8 broad. The beak is subterminal, shell thin, concentric lines of growth very apparent, hinge-line long and straight. The umbo does not project much. From the *Anthracomyæ* it differs mainly in point of size, and approaches in outline some of the species with subcentral beaks. The general similitude to *Naiadites*, Dawson, is much stronger, as is shown by comparison with some of the figures given by Dr. Wheelton Hind (Mon. *Carbonicola, Anthracomya*, and *Naiadites*, Pt. 2, 1895, t. 17, ff. 35-38—*N. triangularis*—and t. 18, f. 34—*N. elongata*). It is impossible, in the absence of the hinge structure, to say definitely to which genus this form belongs. The other specimen is very indistinct and much crushed—20 mm. long, 9 broad. Beak central, shell apparently thin, with strong concentric ridging. This form was found by Mr. W. Martin, and is most probably a *Unio*.

Mr. Palmer exhibited branches of an Ulnus from his garden at Lawson, which had been ring-barked and killed by the larvæ of a longicorn (probably a species of *Monohammus*). Also an undetermined fungus growing abundantly round the roots of Eucalypts, which is eaten with avidity by cows.

Mr. Baker exhibited herbarium specimens, as well as samples of timber and oil, of the Eucalypts described in his paper.

THURSDAY, JULY 28TH, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Thursday evening, July 28th, 1898 (Wednesday being a public holiday).

Mr. Henry Deane, M.A., F.L.S., Vice-President, in the Chair.

The Chairman made appreciative reference to the memorial notices of the late Messrs. T. Kirk and W. M. Maskell, of New Zealand, received from Sir James Hector, copies of which were laid on the table.

The Chairman also called the attention of Members to a circular setting forth the aims and objects of the recently formed Library Association of Australasia, which proposes to hold its first meeting in Sydney, in October, 1898.

Zoological Society of Philadelphia—Twenty-Sixth Annual Report (April, 1898). *From the Society.*

American Museum of Natural History, New York—Bulletin. Vol. x. Articles ix.-x. (pp. 159-168; May, 1898). *From the Museum.*

Johns Hopkins University, Baltimore—Hospital Bulletin. Vol. ix. No. 86 (May, 1898): University Circulars. Vol. xvii. No. 135 (June, 1898). *From the University.*

American Naturalist. Vol. xxxii. No. 376 (April, 1898). *From the Editor.*

Museum of Comparative Zoology at Harvard College, Cambridge, Mass.—Bulletin. Vol. xxviii. No. 4 (April); Vol. xxxi. No. 7 (May); Vol. xxxii. Nos. 3-5 (April-June, 1898). *From the Director.*

U.S. Department of Agriculture, Washington, D.C.—Farmers' Bulletin. No. 75 (1898): Yearbook for the Year 1897: Division of Entomology—Bulletin. New Series. Nos. 10, 12 and 13. (1898). *From the Secretary of Agriculture.*

Zoologischer Anzeiger. xxi. Band. Nos. 560-561 (Juni, 1898). *From the Editor.*

Verein für Erdkunde zu Leipzig—Mitteilungen, 1897. *From the Society.*

Field Naturalists' Club of Geelong—Geelong Naturalist. Vol. vi No. 4 (June, 1898). *From the Club.*

Field Naturalists' Club of Victoria—Victorian Naturalist. Vol. xv. No. 3 (July, 1898). *From the Club.*

Department of Agriculture, Perth, W.A.—Official Report of the Proceedings of the Sixth Annual Conference of Producers (1898): Producers' Gazette and Settlers' Record. Vol. v. Part 5 (May, 1898). *From the Secretary.*

Perak Government Gazette. Vol. xi. Nos. 15-16 (June, 1898). *From the Government Secretary.*

Zoological Society of London—Abstract, 7th June, 1898: Proceedings, 1898. Part i. (June): Transactions. Vol. xiv. Part 6 (June, 1898). *From the Society.*

Royal Society of London—Proceedings. Vol. lxiii. Nos. 396-397 (June, 1898). *From the Society.*

Scottish Microscopical Society—Proceedings. Vol. ii. No. ii. (Session, 1896-97). *From the Society.*

Naturwissenschaftlicher Verein zu Bremen—Abhandlungen. xiv. Band. 3 Heft (1898); xv. Band. 2 Heft (1897). *From the Society.*

Zoologische Station zu Neapel—Mittheilungen. xiii. Band. 1 und 2 Heft. (1898). *From the Director.*

Naturwissenschaftlicher Verein des Reg.-Bezirks, Frankfurt a. d. O.—Societatum Litteræ. Jahrgang xi. Nos. 7-12 (July-Dec., 1897); Jahrg. xii. Nos. 1-4 (Jan.-April, 1898): Helios. xv. Band (1898). *From the Society.*

Naturwissenschaftlicher Verein in Hamburg—Verhandlungen, 1897. Vierte Folge. No. v. *From the Society.*

University of Melbourne—Examination Papers, Matriculation, May, 1898. *From the University.*

Société Hollandaise des Sciences à Harlem—Archives Néer-

Royal Society of Queensland—Proceedings. Vol. xiii. (1897). *From the Society.*

Botanic Gardens and Domains, Sydney—Annual Report of the Director for the Year 1897. *From the Director.*

Royal Society of New South Wales—Journal and Proceedings. Vol. xxxi. (1897). *From the Society.*

Asiatic Society of Bengal—Journal. Vol. lxi. Part i. Extra No. 3 (1892); Vol. lxvi. Part i. No. 4; Part ii. No. 4 (1897); Vol. lxvii. Part i. No. 1 (1898); Proceedings, 1897, Nos. ix.-xi. (Nov.-Dec.); 1898, Nos. i.-iv. (Jan.-April.) *From the Society.*

Australasian Journal of Pharmacy, Melbourne. Vol. xiii. No. 151 (July, 1898). *From the Editor.*

Department of Mines, Melbourne — Annual Report of the Secretary for Mines and Water Supply during the Year 1897. *From the Secretary for Mines.*

South African Philosophical Society, Cape Town—Transactions. Vol. ix. Part 2 (1896-97). *From the Society.*

Royal Microscopical Society, London—Journal, 1898. Part 3 (June). *From the Society.*

Société Impériale des Naturalistes de Moscou—Bulletin. Année 1897. No. 4. *From the Society.*

Académie Royale des Sciences et des Lettres de Danemark, Copenhague—Oversigt, 1898. Nr. 2-3. *From the Academy.*

Sociéte des Naturalistes de Kiew—Mémoires. Tome xiv. Liv. 2 (1897); Tome xv. Livs. 1-2 (1896-98). *From the Society.*

Natural History Society of Montreal—Canadian Record of Science. Vol. vii. Nos. 5-7 (1897-1898). *From the Society.*

Canadian Institute, Toronto—Transactions. Vol. v. Part 2 (No. 10; May, 1898). *From the Institute.*

Pamphlet—Further Coccid Notes. (Trans. N.Z. Inst. Vol. xxx. 1897). By W. M. Maskell. *From Mrs. Maskell.*

Cambridge Philosophical Society—Proceedings. Vol. ix. P viii. (June, 1898). *From the Society.*

REVISION OF THE AUSTRALIAN CURCULIONIDÆ BELONGING TO THE SUBFAMILY *CRYPTORHYNCHIDES.*

By Arthur M. Lea.

Part II.

In this part several genera close or moderately close to *Poropterus* are brought together. For *Poropterus porrigineus*, *P. lemur* and *P. tumulosus* new genera have been proposed; a number of species referred by Mr. Pascoe to *Acalles* are placed in *Decilaus*, and *Petosiris* has been regarded as a synonym of *Paleticus*.

Femora edentate.
  Femora not grooved.
    Elytra more or less distinctly tuberculate or fasciculate..... Poropterus.
    Elytra not tuberculate or fasciculate..... Elæagna.
  Femora more or less distinctly grooved.
    Elytra tuberculate.
      Elytra rounded posteriorly..... Microporopterus.
      Elytra abruptly declivous posteriorly.
        Mesosternal receptacle large and almost truncate in front..... Pseudoporopterus.

feebly curved, widening to base and apex. *Antennæ* short, rather thick; scape inserted almost in exact middle of rostrum and never reaching apex; funicle subcylindric, two basal joints elongate, the rest gradually widening; club short, ovate, continuous with funicle. *Prothorax* large, apex entire and overhanging head, base truncate, sides rounded, constriction absent, ocular lobes prominent. *Scutellum* absent. *Elytra* subparallel or gradually decreasing from base, no wider than prothorax, base truncate, shoulders feebly clasping prothorax or not. *Pectoral canal* wide and rather deep, terminating between two anterior pairs of coxæ. *Mesosternal* receptacle strongly raised, its apex thin and widely emarginate, rapidly sloping to base, middle of declivity subcostate, cavernous. *Metasternum* short. Basal segment of *abdomen* very large, almost as long as rest combined, sloping towards apex; 2nd subequal with intermediate at its middle, longer at sides; three apical enclosed within elytra and depressed; apical as long as intermediates; sutures of all very distinct. *Legs* moderately short; femora linear, edentate, posterior feebly passing elytra; tibiæ short, subcylindric, straight or almost straight; tarsi rather stout, subcylindric, spinose beneath, 3rd joint entire, similar to 2nd, claw-joint and claws long. Cylindric, elliptic, strongly convex above, punctate, squamose, setose, apterous.

I have three species (but only four specimens) under examination. They are all densely clothed with small scales mixed with a substance (indissoluble in alcohol) which causes them to appear as if covered with paste, and which is continued even to the claw-joint; the setæ are always visible, but in some places the scales are entirely concealed. The genus may be readily distinguished on account of its large prothorax, simple tarsi, and peculiar abdomen; the pectoral canal is densely squamose throughout. In describing the genus Pascoe says, "the hind femora not extending beyond abdomen." This is a mistake; if the femora be extended their full length it will be seen that they slightly pass the elytra, though in their ordinary position they do not appear to extend so far. All the species are black, with antennæ and claws dull piceous-red; the club slightly darker.

Of the three species described below *variolaris* is the most distinct; *inepta* is perhaps but a variety of *squamibunda*, but is sufficiently distinct to receive a name. They may be thus distinguished :—

Prothorax about half the size of elytra; elytral setæ irregular..... *variolaris*, n.sp.
Prothorax much more than half the size of elytra; elytral setæ in regular rows.
  Suture at base of elytra feebly produced (base feebly bisinuate).. ..... *inepta*, n.sp.
  Base of elytra truncate*.... .. .. *squamibunda*, Pasc.

ELÆAGNA SQUAMIBUNDA, Pasc.; Mast. Cat. Sp. No. 5454.

Densely covered with small, dingy, pale greyish-yellow scales entirely concealing derm except middle of intermediate abdominal segments, apical two-thirds of rostrum and antennæ; head and base of rostrum spongiose; antennæ feebly covered with a whitish substance and with small setæ. Punctures of prothorax and under surface each carrying a small pale seta, elytra with similar setæ but on interstices. Ciliation very short, moderately dense.

Head large, broad; ocular fovea traceable. Rostrum moderately elongate, densely and coarsely punctate. Scape considerably wider at apex than base; 1st joint of funicle longer than 2nd, 4th-7th transverse. *Prothorax* subobcordate, slightly longer than wide, with numerous small round pits in the scales marking

For the opportunity of redescribing this species, I am indebted to Mr. George Masters.

ELÆAGNA INEPTA, n.sp.

Similarly clothed to the preceding, but the scales paler and slightly more dense, the setæ paler and less noticeable except on the basal and apical segments of abdomen; head more densely clothed, apex of rostrum apparently washed with a whitish substance. Ciliation short, feeble.

Head moderately large, subconvex; ocular fovea invisible. Rostrum rather short, densely and coarsely punctate. Funicle with 1st joint distinctly longer and thicker than 2nd, 3rd-7th transverse. *Prothorax* obcordate, punctures as in preceding but larger and less numerous. *Elytra* with posterior declivity more abrupt than in preceding, the striæ more noticeable, interstices with fewer and less noticeable transverse impressions. *Under surface* as in preceding. *Legs* slightly longer, tibial hooks longer and thinner. Length 6 (vix), rostrum $1\frac{1}{2}$; width $2\frac{2}{3}$ mm.

Hab.—West Australia: Pelsart Island.

This species is extremely like the preceding, but differs in a number of details; besides the base of the elytra the ciliation of the ocular lobes is very different (a character which cannot be seen till the head is removed); there are slight differences in the clothing; the scape is scarcely the length of the two basal joints of funicle, in *squamibunda* it is slightly longer. The difference in size is not perhaps specific and the comparative length of rostrum may be sexual. My unique specimen was taken on a sandy beach close to a heap of seaweed; it was very ungainly in its movements and frequently toppled over; on a smooth flat surface it acted as if intoxicated, in this respect resembling several species of *Aterpus*.

ELÆAGNA VARIOLARIS, n.sp.

Densely clothed with small muddy-brown scales entirely concealing derm, except mandibles and antennæ; a feeble patch of pale slaty-grey scales on each shoulder and on posterior declivity.

Antennæ setose, not at all squamose or mealy; setæ more distinct on prothorax and more numerous and irregular on elytra than in either of the preceding. Ciliation short, feeble.

Head rather small (for the genus), subconvex; ocular fovea appearing as a shallow transverse impression; densely punctate, the punctures distinct and setose. Basal two-thirds of rostrum punctate as head, apical third with punctures visible to derm. Funicle with 1st joint slightly longer than 2nd, 4th-7th transverse. *Prothorax* scarcely longer than wide, with moderately dense, large, round, shallow punctures, somewhat unevenly distributed and leaving a narrow interrupted median line, each puncture carrying a small seta which does not rise above the general level. *Elytra* slightly wider than base of prothorax, with nine rows of strongly impressed punctures, the two rows nearest the suture smaller and more distinct than the others; in the other rows they are larger, transverse and contiguous; interstices feebly raised, near suture straight, about the middle zigzag-shaped or appearing as a succession of small v's, apex with somewhat irregular punctures. *Under surface* much as in the two preceding species: mesosternal receptacle a little more noticeably raised and shorter from base to apex. Length 6, rostrum $1\frac{2}{3}$; width $2\frac{2}{3}$ mm.

Hab.—North West Australia: Upper Ord River (Mr. Richard Helms).

deep, terminated between anterior amd intermediate coxæ. *Mesosternal receptacle* raised, semicircular, its apices touching anterior coxæ; cavernous. *Metasternum* short, curved. Two basal segments of *abdomen* large, intercoxal process wide, curved; intermediate very small, feebly depressed below apical and distinctly below 2nd, apical not as long as 2nd. *Legs* short; femora linear, edentate, the four posterior feebly grooved beneath, posterior not extending to apex of abdomen; tibiæ compressed, feebly curved; tarsi rather thick, 3rd joint distinctly bilobed, 4th feebly squamose. Short, subelliptic, convex, squamose, punctate, tuberculate, apterous.

The three species here described might perhaps be regarded as forming one of the divisions of *Poropterus*, but as their position is clearly intermediate between that genus and *Petosiris* I have considered it advisable to generically separate them. From *Poropterus* the species are excluded by their short broad form, transverse prothorax, large 2nd abdominal segment and small intermediates, and by the femoral grooving; from *Petosiris* (to which they are perhaps closer) by the much less flattened form, much less sudden compression of the apical abdominal segments by the elytra, feebly grooved and edentate femora, and by the tarsi, especially the 3rd joint. All the species are black, the antennæ, tibial hooks, and claws more or less red. They are very closely allied, but are certainly distinct; the following tabulation of the species is not very satisfactory.*

Elytral tubercles regularly disposed..... *regularis*, n.sp.
Elytral tubercles somewhat irregular both in size and disposition.
Elytra conjointly rounded at apex..... *tumulosus*, Pasc.
Elytra feebly bifurcate at apex .... *curvirostris*, n.sp.

MICROPOROPTERUS TUMULOSUS, Pasc.; Mast. Cat. Sp. No. 5443.

(*Poropterus tumulosus*, Pasc.)

Densely clothed with short greyish-brown scales, scales on tubercles paler than elsewhere. Scales of under surface and

* I scarcely think it desirable to give tabulations on characters of degree, unless such are very strongly marked and unmistakable.

legs paler than upper; tibiæ with obscure blackish rings. Head and rostrum densely squamose. Ciliation very minute and glassy.

Head convex, punctures concealed, ocular fovea invisible, a feeble depression between eyes. Rostrum moderately long, distinctly but not strongly curved, feebly dilated at apex. Scape inserted about two-fifths from apex of rostrum, just passing apex, two basal joints elongate, subequal, 3rd-7th transverse. *Prothorax* convex, sides rounded, apex narrowed, a depression along median line; with eight obtuse tubercles placed in two transverse approximate series, and a very obtuse tubercle on each side of apex; densely punctate, punctures almost concealed. *Elytra* subovate, base slightly wider than prothorax, widest a little behind middle, with rather large regular punctures partially concealed by scales; each with numerous small rounded tubercles smaller on posterior declivity than elsewhere; excluding these there are four on the 2nd interstice and a smaller one near base, two on each of the 4th and 5th, and a few smaller ones at the sides; apex conjointly rounded. Punctures of *under surface* entirely concealed. Length $6\frac{1}{2}$, rostrum $1\frac{2}{3}$; width $3\frac{1}{2}$ mm.

Hab.—South Australia (Messrs. Blackburn and Masters); "S. Australia and Tasmania" (Pascoe).

The scales on the upper surface of this species are very peculiar (in fresh specimens) appearing (owing to their slightly overlapping) as if they were themselves punctate.

Head with a feeble tubercle on each side, ocular fovea invisible. Rostrum moderately long, curved, with feeble elongate punctures. Scape inserted slightly in advance of middle of rostrum, scarcely extending to apex; two basal joints of funicle equal, their combined length almost equal to that of scape. *Prothorax* feebly transverse, about as deep as long, apex rounded, about half the width of the base; feebly bifurcate, with two transverse rows of feeble tubercles; sides rounded, feebly decreasing to base; densely punctate, punctures partially concealed. *Elytra* subovate, base wider than prothorax, widest a little behind the middle, with regular rows of rounded tubercles, appearing regular when viewed longitudinally, transversely, or obliquely, placed on each elytron thus:— ⁘, with others less regular at apex and sides; a puncture between each tubercle, largest punctures at sides, smallest on posterior declivity. *Mesosternal receptacle* punctate, Basal segment of abdomen once and one-third longer than 2nd, at its sides scarcely longer. Length $6\frac{4}{5}$, rostrum $1\frac{3}{4}$; width $3\frac{1}{2}$ mm.

Hab.—Victorian Mountains (Rev. T. Blackburn's, No. 6213); New South Wales (Mr. W. Kershaw, Senr.), Orange (Mr. H. W. Brown), Glen Innes (Lea).

Two specimens from Mr. Kershaw are much abraded; on these the elytral punctures are seen to be large and regular and the tubercles smaller, and the under surface to be rather strongly punctate.

MICROPOROPTERUS CURVIROSTRIS, n.sp.

Clothed with small obscurely coloured scales, and with longer sooty scales marking prothorax at sides of apex and on each side of median line, and with others sprinkled about; elytral tubercles with sooty scales. Under surface with paler scales than upper, and mixed with ochreous on intermediates; legs with dark scales which are darkest on tibiæ. Head and rostrum densely squamose, scales palest at base of former. Ciliation sparse and almost microscopic.

Head with trace of a very feeble tubercle on each side of middle; ocular fovea concealed. Rostrum moderately wide, distinctly curved. Scape inserted slightly in advance of the middle, scarcely extending to apex of rostrum; two basal joints of funicle equal, moderately elongate, the others transverse. *Prothorax* noticeably transverse, apex feebly bifurcate, not half the width of base; sides rounded, feebly decreasing to base. *Elytra* wider than prothorax, and not more than once and one-half its length, not much longer than wide, widest about the middle, each feebly separately rounded or bifurcate; punctures almost as in preceding; tubercles somewhat as in preceding but less regular when viewed obliquely; they are also less numerous and proportionally larger. Sutures of *abdomen* concealed by scales. Length 5, rostrum 1; width 3 mm.

Hab.—N.S.W.: Sydney.

Besides the difference in size and colour the present differs from the preceding species (of which I have both sexes) in having the rostrum thicker, shorter and more noticeably curved, the antennæ shorter and almost black (in that species they are decidedly reddish), the elytra broader and the apical curvature more pronounced, the third tarsal joint also a little narrower.

PSEUDOPOROPTERUS, n.g.

Head flattened; ocular fovea small. *Eyes* produced in front,

thick; femora edentate, the four posterior (and less noticeably the anterior) grooved almost their entire length for reception of tibiæ, posterior just passing apex of elytra; tibiæ compressed, slightly curved; tarsi rather long, thick, 3rd joint not widely bilobed, 4th thick, inserted almost at extreme base of 3rd, squamose; claws free, not widely separated. Parallel-sided, convex, squamose, punctate, granulate, tuberculate, apterous.

Separated from *Poropterus* on account of the shape and position of mesosternal receptacle, shape of 2nd abdominal segment and strongly depressed intermediates, and the grooved femora.

PSEUDOPOROPTERUS LEMUR, Pasc.; Mast. Cat. Sp. No. 5431.

(*Poropterus lemur*, Pasc.)

Thick, subcylindrical. Black, opaque; antennæ and claws piceous. Clothed all over with minute, uniformly muddy or sooty-brown scales, a few more elongate towards sides. Under surface with similar scales to upper, but with the minute ones still more minute and the long ones longer, especially on legs. Head and rostrum equally clothed with minute scales, but the head from the middle to a short distance on rostrum with elongate scales. Ciliation of ocular lobes short, golden-yellow.

Head flat; ocular fovea elongate, almost obsolete. Rostrum thick, almost parallel to apex, coarsely punctate, punctures sometimes concealed, a feeble groove at sides on basal two-thirds, three feeble irregular carinæ between antennæ. Scape inserted about two-fifths from apex of rostrum and just reaching apex; 1st joint of funicle thick, but narrower than the others, 2nd once and one-half the length of 1st and nearly as long as the four following combined, 2nd-7th with three or four rows of coarse setæ; club free, subpyriform. *Prothorax* slightly longer than wide, and wider than deep; apex produced, narrow, subtruncate, not half the width of base; obliquely increasing in width to slightly in advance of middle, from thence feebly decreasing to base; densely granulate, the granules largest near base. *Elytra* not wider than greatest width of prothorax, and not once and one-half its length;

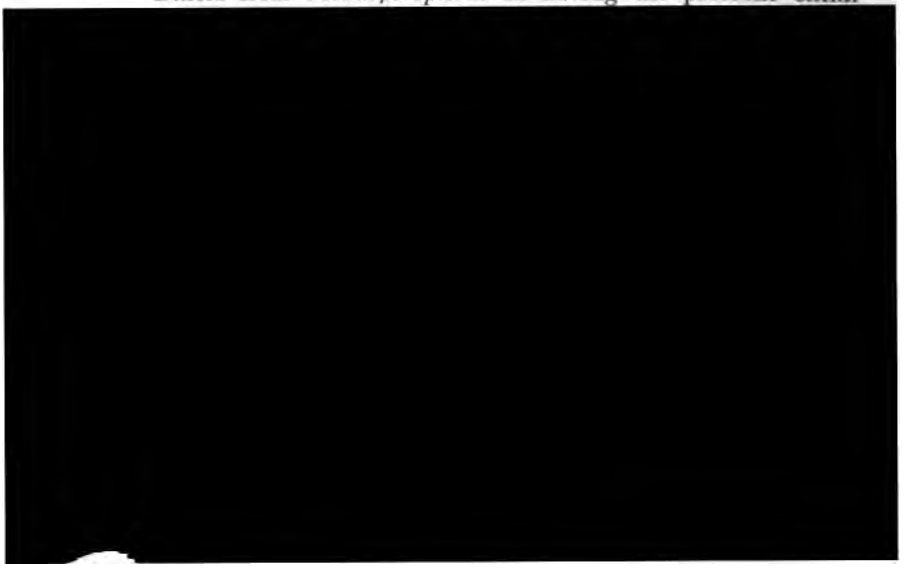
base feebly trisinuate, shoulders feebly produced on to prothorax; densely and somewhat irregularly granulate, the granules—especially at sides—with a small shining tip; suture itself not granulate at the base very feebly raised; 2nd interstice slightly raised and thickened at base; on each side of summit of posterior declivity (which is almost vertical) a large, very distinct, rounded, feebly granulate tubercle; sides with regular rows of very shallow punctures, but striation distinct, feebler and more interrupted on disc; apex rounded. Basal segment of *abdomen* not twice the length of 2nd, apical feebly convex, longer than 2nd and almost twice the length of intermediates. *Coxæ* more or less noticeably punctate; posterior femora in addition to the inner groove with a feeble outer one. Length 11, rostrum 4; width 5; variation in length 8-12 mm.

Hab.—Queensland: Cairns (Macleay Museum, and Mr. G. Masters), Mt. Bellenden-Ker (Rev. T. Blackburn).

The two large tubercles marking the summit of posterior declivity of elytra are very prominent, and cause the species to be one of the most distinct in the subfamily; owing to the declivity being almost vertical they project slightly beyond the apex.

Poropteroides, n.g.

Differs from *Pseudoporopterus* in having the pectoral canal



consideration the further structural differences mentioned (together with others which might only be regarded as specific) it appears advisable to generically separate the two species.

POROPTERIDES DICHOTOMUS, n.sp.

Short, subcylindric. Black, opaque; antennæ and claw-joint piceous-red. Very densely clothed all over with ferruginous scales tinged with ochreous on posterior declivity and shoulders of elytra, paler beneath than above; pectoral canal densely clothed with scales which are paler and longer than elsewhere; elongate but coarse scales feebly showing on prothorax and base of elytra, more noticeably on tubercles at summit of declivity. Under surface and head between eyes with elongate scales. Rostrum with scales at base and sides, and with others smaller and sparser continued almost to apex. Ciliation sparse, short, white.

Head without visible fovea. Rostrum feebly increasing in width to apex; densely and irregularly punctate; a groove extending on each side from base to slightly in advance of antennæ, and with several less distinct grooves more or less interrupted by punctures. Antennæ elongate; scape inserted about one-third from apex of rostrum, passing apex; basal joint of funicle not much shorter than 2nd, 2nd no longer than the two following combined, 4th slightly longer than 3rd, 7th transverse; club free, elongate. *Prothorax* longer than wide, and slightly wider than deep, apex about one-third the width of base, obliquely increasing in width to about the middle, feebly decreasing from thence to base; disc convex. *Elytra* not much longer and very slightly wider than prothorax; posterior declivity almost vertical, broad and flat, and slightly longer than rest of elytra, its summit marked with two moderately distinct rounded tubercles on each side, one on 2nd the other on 3rd interstice, the scales on the tubercles slightly darker than on declivity, but paler than on disc; sides somewhat flattened, between tubercles and margins with seven rows of punctures, the striation distinct, but the punctures almost hidden, and entirely covered with s

Posterior *femora* slightly passing apex of elytra. Length 8, rostrum 2⅓; width 3¾ mm.

Hab.—N.S.W.: Tweed River.

A very distinct species, rendered so by the length and abruptness of the posterior declivity, the elytra when seen from the sides (in conjunction with the sides of mesosternum) appearing almost quadrate. It is perhaps more densely clothed with scales than any other species allied to *Poropterus*; several species of the subfamily are squamose at apex or sides of pectoral canal, but in this species the canal is densely clothed with distinct scales for its entire length; the scales almost entirely conceal the sutures of the under surface. Seen from above the prothorax appears to be nearly the length of elytra.

Genus DECILAUS, Pascoe.

Trans. Ent. Soc., 1870, p. 205.

Head rather large, not concealed by prothorax. *Eyes* rather small, distant, coarsely faceted. *Rostrum* as long or slightly shorter than prothorax, curved, moderately wide, incurved to middle. *Antennæ* moderately long; scape inserted either slightly in advance of or slightly behind middle; two basal joints of funicle long, the others short and increasing in width to 7th; club continuous with funicle, subovate. *Prothorax* transverse,

tarsal joint moderately wide, deeply bilobed, claw-joint feebly pubescent; claws feeble. Elliptic-ovate or ovate, strongly convex, punctate, apterous.

This genus is one of the numerous allies of *Poropterus*; from that genus it is at once distinguished by its strongly grooved femora; *Microporopterus* also has grooved femora, but the eyes and intermediate abdominal segments are different.

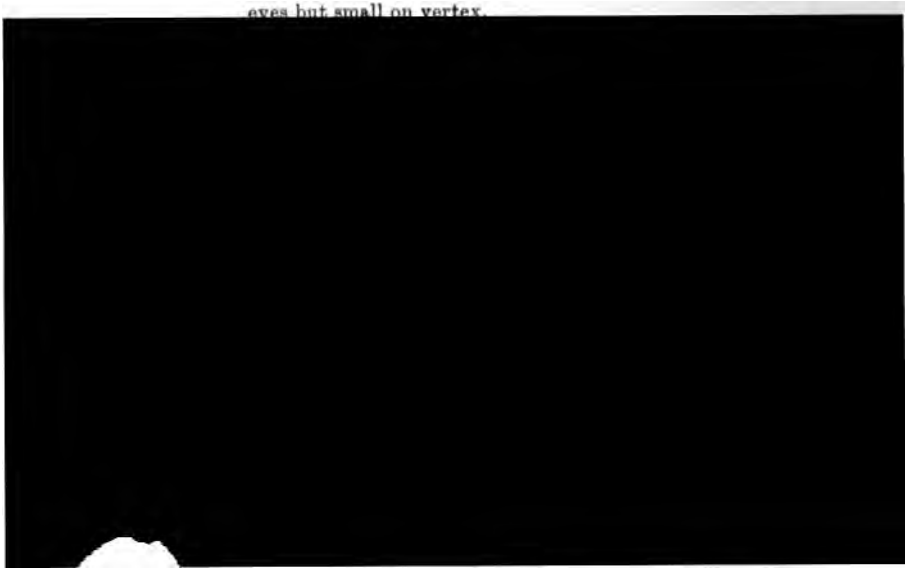
The sexual differences are but slightly marked (I have taken pairs of several species *in cop.*). The male has the scape inserted slightly nearer the apex of rostrum than in the female, the rostrum is a little more densely punctate and the whole insect is smaller. The scape varies in length from little more than the length of two basal joints of funicle to the length of the funicle itself. The pectoral canal is squamose or setose in the majority of species. The two basal segments of the abdomen are large and usually equal, but the 1st is sometimes considerably larger than the 2nd; the intermediates can scarcely be said to be depressed below level of apical, though the greater part of each is usually depressed, leaving only a narrow ridge in front. The coxæ are almost contiguous laterally, though widely separated internally; the tibiæ are punctured in rows, and as each puncture carries a scale they appear to be grooved and to a certain extent resemble the tibiæ of many of the species belonging to *Melanterius* and *Tyrtæosus*. All the species are opaque or subopaque and black with dull red antennæ; the tibiæ and tarsi are sometimes tinged with red. They all (with the exception of *xanthorrhoeæ* and *hispidus*) live (during the day time at least) on, or just below the surface of the ground, or under logs and stones.

The type of the genus (*D. squamosus*) was described by Mr. Pascoe in 1870; but subsequently* he described a number of species and referred them to *Acalles*. Of the species referred by him to that genus and which certainly belong to *Decilaus*, I have been enabled to identify *perditus*, *distans*, *memnonius*, *foraminosus* and *cribricollis*; *A. nucleatus* I have not seen, but the

* Ann. Mag. Nat. Hist., (4), xiii. 1874, p. 415.

description leaves no doubt in my mind but that it belongs to *Decilaus*, and consequently I refer it to that genus. *Acalles* appears to be one of the old genera, to which (like *Chrysomela* and *Cryptorrhynchus*) all doubtful or obscure species were referred; the European *A. camelus* appears to be recognised as its type; regarding that species therefore as typical of its genus, *Decilaus* differs in having much shorter tibiæ, femora distinctly grooved, the posterior not extending to apex of abdomen, elytra wider than prothorax at the base, and the whole body shorter and stouter.

With long erect setose hair..... *hispidus*, **n.sp.**
Without long setose hair.
  Ninth elytral interstice wide and highly polished..... *xanthorrhoeæ*, **n.sp.**
  Ninth interstice normal.
    Prothoracic punctures comparatively small and squamose.
      Head with a median carina.
        Prevailing colour of scales white ..... *litoralis*, **n.sp.**
        Prevailing colour of scales brown..... *perditus*, **Pasc.**
      Head without median carina ..... *squamosus*, **Pasc.**
    Prothoracic punctures large or very large, irregularly or not at all squamose.
      Intercoxal process of abdomen without lateral sulci.
        Head with large punctures equal throughout.. *subterraneus*, **n.sp.**
        Head with moderately large punctures between eyes but small on vertex.



DECILAUS SQUAMOSUS, Pasc.; Mast. Cat. Sp. No. 5460.

Clothed with large white scales each set in a puncture and causing both upper and under surfaces to appear speckled. Scales denser on legs and sparser on apical segments of abdomen than elsewhere. Pectoral canal with white scales.

Head, especially on vertex, with considerably smaller punctures than on rostrum. Rostrum wide, feebly incurved to middle; with large and slightly irregular punctures. Scape the length of funicle, inserted nearer apex than base of rostrum and passing apex. *Prothorax* slightly transverse, apex not half the width of base; with moderate-sized regular round punctures almost concealed by scales. *Elytra* oblong-cordate, slightly wider than prothorax and not twice as long, widest slightly behind base; striate-punctate, punctures large, round, in places approximate but usually not; interstices equal in width or wider than punctures, towards apex and sides feebly granulate, with feeble punctures only visible on abraded specimens. Two basal segments of *abdomen* subequal, with large round and comparatively sparse punctures, apical segment densely punctate, intermediates narrowly raised anteriorly, depressed and with large scales posteriorly. Length 5, rostrum 1; width 2 mm.

Hab.—South Australia: Port Augusta.

The prothoracic punctures are deep but almost concealed by the large scales arising from each and which give the surface a speckled appearance; the elytral granules are little more than feeble and irregular elevations of the interstices, but appear to be true granules until the scales are abraded. I have three specimens (taken by Mr. Masters) under examination.

DECILAUS PERDITUS, Pasc.; Mast. Cat. Sp. No. 5476.

(*Acalles perditus*, Pasc.)

Clothed with moderately large scales, varying in colour from white to brown; on the prothorax the scales are usually entirely brown and each one is set in a puncture; on the elytra there are

usually two or three pale irregular transverse fasciæ behind the middle and a distinct white longitudinal spot on each side of base; sometimes the whole elytra are sprinkled with white scales, and occasionally all the scales are brown. Scales on abdomen (except those of the intermediate segments) rather small. Pectoral canal with a few white scales.

Head with moderately large round shallow punctures in front, suddenly becoming minute on vertex; middle with a shining carina. Rostrum comparatively long, very feebly incurved to middle, densely and coarsely punctate. Scape as long as funicle, inserted nearer apex than base of rostrum and passing apex. *Prothorax* transverse, near apex suddenly and strongly narrowed; densely but not strongly punctate, punctures round, rather shallow and partially concealed; median line marked by a feeble impunctate space. *Elytra* oblong-cordate, slightly wider than prothorax and not twice as long, widest near base; striate-punctate, punctures moderately large, irregularly rounded; interstices convex, distinctly wider than punctures, with comparatively large punctures, towards apex and sides obsoletely granulate. *Abdomen* as in preceding. Length $4\frac{1}{3}$, rostrum $1\frac{1}{8}$; width $2\frac{1}{7}$; variation in length 4-6 mm.

Hab.—S.W. Australia: "Albany and Melbourne" (Pascoe).

Common under logs and stones in the coastal districts from Swan River to Albany. The species is allied to the preceding,

wider than prothorax, considerably wider about the middle; striate-punctate, punctures comparatively small; interstices much wider than punctures, each with a distinct row of small punctate and rather distant granules. *Abdomen* as in two preceding species. Length 4½, rostrum 1¼; width 2⅔; variation in length 3½-6½ mm.

Hab.—W.A.: Geraldton and Swan River.

This species is exceedingly abundant under a spiny thick-leaved beach-growing plant about Geraldton; at Fremantle I have only taken three specimens. It may be distinguished from the preceding by its much paler scales, wider elytra, denser prothoracic punctures and more regular elytral granules; these in fresh specimens are very distinct and cause the elytra to appear regularly dotted with small black spots; in old or abraded specimens, however, they are less distinct. From *squamosus* it may be distinguised by its much wider elytra, carinate head, &c.

DECILAUS XANTHORRHOEÆ, n.sp.

Head feebly, the prothorax very feebly squamose; elytra rather densely squamose, the scales mostly black but with small spots of whitish scales irregularly distributed and more numerous towards apex than base. Under surface (except apical segment of abdomen where they are dense) with sparse greyish scales; legs with rather long white scales, femora feebly ringed. Pectoral canal not scaly.

Head depressed and with moderately strong punctures between eyes, becoming very small on vertex. Rostrum shining, feebly punctate, feebly but regularly and distinctly dilating to base and apex. Scape long, but shorter than funicle, inserted about two-fifths from apex of rostrum and passing apex. *Prothorax* slightly transverse, apical third not half the width of base; with dense, large, round, deep punctures. *Scutellum* present, but small and indistinct. *Elytra* subcordate, wider than prothorax at base and widest at about one-third their length from base; striate-punctate, punctures large, oblong, contiguous; interstices rather strongly convex and varying from a little narrower to a little wider than punctures; 9th interstice wide, flat, shining, impunctate and

without scales, sutural interstice for about one-third its length similar except that it slightly slopes to suture. Two basal segments of *abdomen* with large round punctures, the 1st with a distinct but shallow depression in the middle, apical segment densely punctate, intermediates flat, each with a transverse row of punctures, posteriorly not marked with large scales. Length 4, rostrum $1\frac{1}{6}$; width 2; variation in length $2\frac{1}{2}$-$4\frac{1}{4}$ mm.

Hab.—W.A. : Swan River, Pinjarrah, Bunbury, &c.

Of this species I have seen thousands of specimens at the bases of the leaves of a common species of *Xanthorrhœa* and of *Kingia australis*. The sexes, apart from size (not, however, a reliable feature), are scarcely distinguishable; the male has a slightly longer scape, and the rostrum is a little more scaly at the sides. The punctures of the head are small compared with those of the preceding species, and very much smaller than those of the following. The shining rostrum, but particularly the sutural and 9th interstices, are very distinctive.

Decilaus foveiventris, n.sp.

Upper surface glabrous except for a small spot of dirty grey scales near the apex of each elytron. Under surface, legs, and pectoral canal with rather sparse dingy brown setose scales.

Head rather densely and strongly punctate between eyes, punctures much smaller on vertex; a feeble longitudinal

of *abdomen* with very large, round, deep punctures or foveæ, suture between 1st and 2nd deep at the sides but not traceable across middle; intermediates each with a very feeble transverse setose row of punctures. Length $4\frac{1}{2}$, rostrum $1\frac{1}{4}$; width $2\frac{1}{2}$ mm.

Hab.—W.A.: Donnybrook.

Allied to the following species but may be distinguished by its larger abdominal foveæ, larger punctures of rostrum and smaller elytral punctures.

DECILAUS DISTANS, Pasc.; Mast. Cat. Sp. No. 5468.

(*Acalles distans*, Pasc.)

Upper surface with a few whitish scales, not (to the naked eye) affecting the general colour, except near apex of elytra where a small distinct but somewhat irregular spot is condensed towards each side. Coxæ and sterna rather densely squamose. Pectoral canal with sparse setose scales.

Head with large punctures between eyes, becoming much smaller on vertex. Rostrum densely and strongly punctate, with or without several irregular impunctate spaces, very feebly incurved to middle. Scape shorter than funicle, inserted about two-fifths from apex of rostrum and passing apex. *Prothorax* transverse, apex not half the width of base; with large round punctures smaller at apex and middle than elsewhere. *Elytra* subcordate, wider than prothorax at base and widest just before middle; striate-punctate, punctures large, elongate-oblong, open posteriorly; interstices almost flat, considerably wider than punctures; densely and minutely granulate, each granule punctate in the middle. Two basal segments of *abdomen* with very large round and rather shallow punctures or small foveæ, suture between 1st and 2nd deep at sides and sufficiently distinct across middle; intermediates depressed posteriorly, each with a moderately distinct row of squamose punctures. Length $3\frac{1}{2}$, rostrum 1; width $2\frac{1}{3}$; variation in length $3\frac{1}{4}$-$4\frac{2}{3}$ mm.

Hab.—W.A.: Swan River, Rottnest Island.

DECILAUS MEMNONIUS, Pasc.; Mast. Cat. Sp. No. 5473.

(*Acalles memnonius*, Pasc.)

Glabrous except for a few indistinct pale yellow scales. Legs sparsely, pectoral canal not squamose.

Head large, with large round punctures, smaller (but still large) on vertex than between eyes. Rostrum feebly increasing from base to apex, moderately strongly but not densely punctate, punctures not confluent. Scape short, very slightly longer than two basal joints of funicle, inserted slightly nearer base than apex of rostrum and not extending to apex. *Prothorax* rather strongly transverse; with large round punctures very uniform in size, except that at apex they are smaller. *Elytra* subcordate, widest about the middle, thence arcuate to apex; striate-punctate, punctures large, round or almost round, feebly or not at all open posteriorly; interstices at suture the width of, towards the sides slightly wider than punctures, convex, with scattered minute punctures and without granules. *Metasternum* with a distinct transverse impression on each side. Basal segment of *abdomen* with moderately large punctures, intercoxal process with a distinct transverse sulcus on each side, separated by an impunctate ridge; 2nd segment with very large punctures or foveæ, the suture between 1st and 2nd marked with large punctures; intermediates each with a row of about eight small but distinct punctures

Head large, rather strongly convex, densely, strongly and equally punctate throughout. Rostrum slightly shining, basal two-thirds subparallel, apex enlarged, not very densely or coarsely punctate, an almost impunctate mèdian space. Scape the length of four basal joints of funicle, in ♀ inserted almost in exact middle of and just extending to apex of rostrum, in ♂ inserted slightly nearer to and just passing apex. *Prothorax* feebly (by measurement) transverse, but apparently as long as wide, apex depressed and subtubular, with dense large round regular punctures smaller at apex than elsewhere. *Elytra* subcordate, slightly wider than prothorax at base, widest slightly before middle; punctures large, oblong; interstices narrower than punctures, especially those in the 5th-7th striæ, irregularly and feebly wrinkled and obsoletely punctate. *Metasternum* with a depression on each side. Basal segment of *abdomen* rather feebly and irregularly punctate, intercoxal process with a feeble sulcus on each side, 2nd segment rather more strongly punctured than 1st, its length in the middle equal to that of 5th; intermediates each with two very irregular rows of squamose punctures. Anterior *femora* with a very feeble tooth visible from but few directions. Length 4, rostrum 1; width 2⅓ mm.

Hab.—W.A.: Albany (Masters and Lea).

Although by actual measurement this species is seen to be not twice as long as wide, it appears to be much longer. Of the two other species (*foraminosus* and *subterraneus*) having the head strongly and equally punctate, the present may be distinguished by its more elongate shape, but especially by its much less coarsely punctured prothorax and femoral tooth (if such it can be called, as it appears to be a feeble triangular extension of the ridge bordering the median groove). Mr. Masters has lent me two specimens labelled *Tentegia hypocrita*, Pasc. MS.; the species, however, is a true *Decilaus*; *Tentegia* is described as having linear tarsi.

DECILAUS SUBTERRANEUS, n.sp.

Each prothoracic puncture with a setose scale varying in colour from white to slaty-brown or black; elytral interstices with more

numerous scales but smaller and rounded, with or without several very feeble transverse fasciæ of white scales towards apex. Under surface rather sparsely squamose; femora more or less distinctly ringed. Pectoral canal glabrous.

Head densely, strongly and equally punctate. Rostrum slightly dilated towards apex, strongly punctate, the punctures in irregular grooves, and leaving a shining median space. Scape the length of four basal joints of funicle, inserted nearer apex than base of rostrum and passing apex. *Prothorax* distinctly transverse; with very large round deep punctures or foveæ. *Elytra* subglobose; with large suboblong punctures, in places subcontiguous; interstices feebly convex, wider than punctures. *Metasternum* transversely impressed on each side. Basal segment of *abdomen* considerably larger than 2nd, with a shallow median depression, irregularly punctate, punctures much larger at sides than in middle, 2nd with two irregular rows of very large punctures; intermediates irregularly punctate. Length $3\frac{4}{5}$, rostrum 1; width $2\frac{1}{2}$ mm.

Hab.—W.A.: Rottnest Island.

Several specimens obtained underground close to a wall. This species is allied to *foraminosus*, agreeing in the very large prothoracic punctures (which are very much larger than in the other species here described) and subglobose elytra, but differing in the elytral interstices and intercoxal process of abdomen. The elytra

in the 5th-7th striæ where the punctures are exceedingly large; interstices much narrower than punctures, convex, distinctly but sparsely and irregularly punctate. *Metasternum* with a distinct depression in middle, narrowing to the sides. *Abdomen* irregularly punctate, basal segment raised above and almost twice the length of 2nd, intercoxal process with a transverse sulcus on each side. Length $3\frac{1}{2}$, rostrum 1 (vix); width $2\frac{1}{3}$; variation in length $3\frac{1}{2}$-5 mm.

Hab.—W.A.: "Albany" (Pascoe), Bridgetown (Lea).

DECILAUS CRIBRICOLLIS, Pasc.; Mast. Cat. Sp. No. 5466.

(*Acalles cribricollis*, Pasc.)

Upper surface and pectoral canal clothed as in preceding. Abdomen and sterna with a few white scales almost hidden in punctures.

Head densely and moderately strongly punctate, punctures larger between eyes than elsewhere. Rostrum wide, feebly but noticeably incurved to middle, irregularly punctate, punctures forming lateral grooves. Scape short, scarcely longer than two basal joints of funicle, inserted nearer base than apex of rostrum and not extending to apex. *Prothorax* strongly transverse: with dense large punctures. *Elytra* subcordate, wider than prothorax at base; striate-punctate, punctures large, round or elliptic, distant towards the sides, moderately close towards suture; interstices rounded, much wider than punctures, with minute scattered granules and without punctures. *Metasternum* with a deep impression on each side. Basal segment of *abdomen* almost twice the length of 2nd, with large punctures at sides but small ones in middle, intercoxal process with a deep transverse sulcus on each side; 2nd segment with from eight to ten very large round punctures or foveæ forming a transverse row, and about five marking its suture with 1st; intermediates with a few minute punctures. Length 5 (vix), rostrum ♂ $1\frac{1}{3}$, ♀ $1\frac{1}{3}$; width $3\frac{1}{2}$ mm.

Hab.—W.A.: "Champion Bay" (Pascoe); Rottnest Island (Lea).

Allied to *memnonius*, but with comparatively smaller and less regular elytral punctures, the interstices granulate instead of

punctate, and the elytra themselves considerably wider, wider in fact than in any other species of the genus (width $3\frac{1}{2}$; length diagonally $3\frac{3}{4}$, horizontally $2\frac{4}{5}$ mm.).

DECILAUS HISPIDUS, n.sp.

Clothed with straggling semi-erect hair or very long setæ, mostly black in colour but the prothorax with several feeble clusters of white hairs; elytra with three feeble but distinct stripes of white hairs, one at base, one at summit of posterior declivity, and one between summit and apex. Sterna and two basal segments of abdomen with long white setose hair; legs with long white setæ. Pectoral canal glabrous.

Head with large punctures; eyes prominent. Rostrum rather long, irregularly punctate, punctures of moderate size, and denser towards sides than middle. Scape long, the length of funicle, inserted two-fifths from apex of rostrum and passing apex. *Prothorax* strongly transverse, with dense large round and moderately deep punctures. *Elytra* briefly subcordate, considerably wider than prothorax at base; punctures large, oblong, interstices shining, feebly raised, flat, with very minute punctures and granules towards apex. Basal segment of *abdomen* twice the length of 2nd, densely and strongly punctate, 2nd depressed below 1st, its suture with that segment marked by a row of large punctures; intermediates minutely punctate, the 3rd distinctly narrower than

Genus HEXYMUS, Pascoe.

Journ. Linn. Soc. Zool. xi. p. 188.

Head rather small, not entirely concealed by prothorax; ocular fovea small, distinct or not. *Eyes* large, moderately granulate, subtriangularly produced in front. *Rostrum* long, thin, curved. *Antennæ* long and thin; scape inserted nearer apex than base of rostrum, in ♀ slightly, in ♂ considerably passing apex; 2nd joint of funicle long; club ovate, free, joints oblique. *Prothorax* slightly transverse, apex much narrower than base; ocular lobes obtuse; constriction feeble; base bisinuate; sides precipitous; scutellar lobe small. *Scutellum* small, distinct, not depressed. *Elytra* wider than prothorax and about twice its length, apex narrow, conjointly rounded, posterior declivity (along suture) subequal to anterior portion. *Pectoral canal* narrow, deep, terminated near bases of intermediate coxæ. *Mesosternal receptacle* feebly raised, base and sides thin, apices touching anterior coxæ, emargination considerably longer than wide, slightly cavernous. *Metasternum* very narrow, constricted in middle, dilated towards episterna; these moderately large, the length of two basal segments of abdomen. *Abdomen* regularly decreasing in width to apex, sutures distinct; basal segment almost twice the length of 2nd, intercoxal process moderately narrow, rounded, intermediates combined longer than 2nd or apical and not at all depressed. *Legs* long; posterior trochanter distinctly smaller than visible parts of coxæ; femora scarcely grooved, each with a distinct sharp tooth, posterior in ♂ passing, in ♀ scarcely extending to apex of elytra; tibiæ thin, compressed, curved; tarsi slender, 1st joint grooved beneath, 3rd rather small, deeply bilobed, 4th long, pubescent or not; claws widely separated. Short, broad, deep, squamose, punctate, tuberculate, apterous.

Mr. Pascoe says that this genus is "apparently allied to *Poropterus*, although the metathoracic episterna are very large." It does not appear to be close to any described Australian genus (except possibly *Plagiocorynus*), though to a certain extent resembling *Petosiris*, *Onidistus*, &c.

Prothoracic carina strongly elevated on apical half, subobsolete on basal ..... *tuberosus*, Pasc.
Prothoracic carina narrow and regular throughout.
Antennæ dull brownish-red, each elytron with five tubercles..... *monachus*, Pasc.
Antennæ pale red, each elytron with four flattened tubercles..... *subplanatus*, n.sp.

HEXYMUS MONACHUS, Pasc.; Mast. Cat. Sp. No. 5417.

Black, opaque; antennæ dull red, club and apex of scape darker, apical half of rostrum highly polished. Upper surface moderately densely clothed with small and moderate scales, uniform in colour but varying in different specimens from slaty to sooty or ferruginous-brown. Under surface more densely clothed than upper and with elongate paler scales scattered about, a feeble stripe continuous from mesosternum to apex of abdomen, visible to the naked eye but confused with a lens; femora with a few pale scales towards apex; head and basal half (or third) of rostrum densely squamose. Ciliation silvery-yellow, moderately short.

Head with ocular fovea distinct; shallowly punctate, punctures concealed. Rostrum longer than prothorax, narrow, strongly curved, a feeble carina commencing at base and terminating before insertion of antennæ (more distinct in ♂ than in ♀); apical half moderately strongly punctate in ♂, sparsely and minutely in ♀. Antennæ long; scape inserted one-third from apex of rostrum

punctures rounded, not at all contiguous; posterior declivity at an angle of about 45°, rather feebly punctate, a feeble callosity on each side *Claw-joint* distinctly pubescent. Length $8\frac{4}{5}$, rostrum $2\frac{2}{3}$; width 4 (vix); variation in length 7-$10\frac{1}{2}$ mm.

Hab.—Coastal Districts of Queensland and Northern New South Wales.

An abundant species.

HEXYMUS TUBEROSUS, Pasc.; Mast. Cat. Sp. No. 5418.

Black, opaque; antennæ dull red, club darker; rostrum, except basal fourth, highly polished. Densely clothed with uniformly brown scales; on the upper surface larger scales are regularly scattered over the prothorax and on elytral tubercles; each puncture carries a still larger scale; on the under surface the larger scales are more numerous than on prothorax and there is a still fainter median stripe than in the preceding. Ciliation minute, bright silvery.

Head slightly depressed at base; ocular fovea feeble. Rostrum longer than prothorax, curved, impunctate in ♀, without carina. Antennæ rather more elongate than in the preceding, the 2nd joint perfectly straight and considerably longer than club. *Prothorax* impunctate; a distinct squamose carina on apical half, which is strongly elevated almost in middle, thence towards base it is almost invisible; a moderately distinct tubercle on each side of carina near middle. *Elytra* at base scarcely wider than prothorax, feebly widening to about the middle, basal half not flattened, sides precipitous; each with four large and very distinct tubercles, two on the 3rd and two on the 5th interstices; suture with distant, small glossy granules; seriate-punctate, punctures rounded, smaller and more distant than in the preceding; posterior declivity at an angle of about 35°, rather feebly punctate, two feeble callosities on each side. *Claw-joint* feebly pubescent. Length $8\frac{1}{2}$, rostrum $2\frac{1}{5}$; width $3\frac{2}{3}$; variation in length $8\frac{1}{2}$-10 mm.

Hab.—Coastal Districts of Queensland and Northern New South Wales.

Very distinct from the preceding species on account of its stronger and less numerous elytral tubercles and very different prothoracic carina

HEXYMUS SUBPLANATUS, n.sp.

♀. Black, opaque; antennæ pale red, club slightly darker; rostrum, except basal fourth, highly polished. Upper surface densely clothed with minute muddy-brown scales and with elongate darker scales scattered about, especially on prothorax. Under surface and legs more densely clothed than upper and with numerous elongate scales; head and basal fourth of rostrum densely squamose. Ciliation minute, silvery.

Head slightly convex, ocular fovea invisible. Rostrum somewhat stouter than in either of the preceding, basal third rather strongly carinate and punctate, elsewhere minutely and sparsely punctate. Antennæ moderately long; scape inserted slightly in advance of middle of rostrum and just passing apex; 2nd joint of funicle scarcely twice the length of 1st, slightly longer than three following combined and slightly shorter than club, 7th distinctly transverse. *Prothorax* as in *monachus* except that the sides are less rounded in the middle and the disc less convex. *Elytra* at base wider than prothorax and widening to beyond the middle, basal half somewhat flattened, sides precipitous; each with four moderately large flattened tubercles, two on the 3rd and two on

PLATYPOROPTERUS, n.g.

Head convex, almost concealed by prothorax; ocular fovea distinct. *Eyes* widely separated, moderately faceted. *Rostrum* curved, moderately stout, shorter than prothorax. *Antennæ* moderately stout; scape inserted nearer apex than base of rostrum and passing apex; two basal joints of funicle elongate; club ovate, free. *Prothorax* feebly transverse, ocular lobes feeble and rounded, constriction slight, base bisinuate. *Scutellum* absent. *Elytra* large, shoulders rounded, apex acuminate, sides declivous. *Pectoral canal* deep and moderately wide, terminated between four anterior coxæ. *Mesosternal receptacle* raised, semicircularly emarginate in front, rounded behind, cavernous. Metasternum short, episterna concealed. *Abdomen* large, two basal segments soldered together in middle and two-thirds of total length; intermediates with deep sutures, conjointly considerably shorter than 2nd or 5th, below level of 2nd but not of 5th. *Legs* moderately long; femora moderately stout, very feebly grooved, the anterior scarcely visibly dentate, the others edentate, posterior scarcely extending to apical segment of abdomen; tibiæ compressed, the anterior bisinuate beneath, the others straight; tarsi short, moderately stout, 3rd joint short, deeply bilobed, claw-joint slightly longer than 1st; claws moderately separated. Flat, squamose, punctate, apterous.

The type and only known species of this genus is the *Poropterus porrigineus* of Pascoe. It is separated from *Poropterus* on account of its grooved femora and the basal segments of abdomen being soldered together; from *Paleticus* by the shorter tarsi, base of elytra not trisinuate, straight tibiæ, &c.

PLATYPOROPTERUS PORRIGINEUS, Pasc.; Mast. Cat. Sp. No. 5436.

(*Poropterus porrigineus*, Pasc.)

Black, opaque; antennæ (club darker), tibial hooks and 3rd and 4th tarsal joints piceous-red. Sparsely clothed with small ochreous or brownish scales irregularly distributed and denser on prothorax than elsewhere; in addition with darker and suberect

scales, forming feeble fasciculate patches on prothorax on each side of median line (itself marked by paler scales) and at its sides; elytra with small patches irregularly disposed, but forming a moderately distinct (but feeble) transverse double series about summit of posterior declivity. Under surface (including pectoral canal) moderately clothed with dingy brown suberect scales. Legs with similar but longer scales, the femora in addition marked with two feeble paler rings; tibiæ terminated by a fringe of reddish setæ; tarsi spongiose beneath, feebly clothed above.

Head with the exposed portion small and irregular; obsoletely punctate; a feeble carina on vertex; ocular fovea deep, long and very distinct. Rostrum curved, feebly incurved to middle, apex the width of base; rather coarsely punctate on each side of base, apical half polished and moderately densely punctate; a groove on each side parallel with scrobes commencing just in front of antennæ and continued around upper portion of eyes. Scape inserted about two-fifths from apex of rostrum, nearly half passing; funicle with 1st and 2nd joints equal, their combined length almost equal to that of 3rd-7th. *Prothorax* transverse ($3\frac{2}{3} \times 3$), flat, sides dilated in middle; impunctate on disc, strongly on flanks. *Elytra* subovate, nearly thrice the length of prothorax, not much wider at base but considerably wider about apical third, each separately rounded at base, coarctate towards apex, apex conjointly rounded; disc with large punctures or small foveæ, sub-

grooves. Anterior *legs* noticeably shorter and stouter than posterior. Length 9, rostrum 2; width 4½ mm.

Hab.—" Victoria " (Pascoe). N.S.W : Mount Kosciusko (Mr. W. E. Raymond), Orange (Mr. Horace W. Brown).

I have two specimens under examination, one of which is partially abraded; it appears to have darker clothing than the other specimen; its elytra are not so much dilated beyond the middle; its prothorax is scarcely transverse and the granules on the elytra are less numerous, being five on one side and four on the other, as against eight on each side of the other specimen; it is perhaps a female, but I can find no sexual differences in the rostrum and antennæ.

Genus PALETICUS, Pascoe.

Trans. Ent. Soc. 1870, p. 462.

Head not concealed by prothorax, vertex with four more or less distinct impressions, transversely depressed between eyes. *Eyes* large, moderately (not coarsely) faceted. *Rostrum* long, thin or moderately thin, almost parallel-sided, distinctly curved. *Antennæ* thin; scape inserted nearer apex than base of rostrum, passing apex; two basal joints of funicle elongate; club moderately elongate, free. *Prothorax* transverse, flat or moderately convex; ocular lobes obtuse, ciliate; constriction feeble; base strongly bisinuate; scutellar lobes distinct. *Scutellum* almost invisible,* situate in a depression. *Elytra* subcordate, wider than prothorax, basal two-thirds more or less flattened and parallel, base trisinuate, sides towards apex coarctate, conjointly rounded, sides inwardly oblique. *Pectoral canal* deep, terminated between intermediate coxæ. *Mesosternal receptacle* feebly raised, base and sides rather thick, emargination in ♂ slightly wider than long, in ♀ slightly longer than wide; cavernous. *Metasternum* very short. Two basal segments of *abdomen* large, soldered together, suture scarcely traceable across middle; intercoxal process broad, deeply

* Except in *cordipennis*.

sulcate laterally, three apical segments greatly narrowed by elytra, intermediates conjointly shorter than 2nd or apical. *Legs* long; femora dentate; tibiæ flexuous; tarsi elongate, narrow, above glabrous or with sparse setæ, 3rd joint short, slightly wider than long, deeply bilobed, 4th longer than 1st. Broad, squamose, apterous.

This genus was founded by Mr. Pascoe on five species, of which I know *pedestris* and *frontalis*. Of the others, I am doubtful of *laticollis* and *confinis*, which, however, are very close to *pedestris*; *invidus* although recorded from "Gawler, Victoria, Sydney, and Queensland" I have not seen, or at least been enabled to identify. In the same paper in which Mr. Pascoe described *Paleticus* he very briefly described *Petosiris*, comparing it with *Onidistus*. In describing the genus only one species (*P. subereus*) was referred to it; this species is a true *Paleticus* differing in no essential detail from *P. pedestris*; I think, therefore, that the name *Petosiris* should be sunk as a synonym of *Paleticus*. Subsequently Mr. Pascoe referred two species (*cordipennis* and *annulipes*) to *Petosiris*; both these species I know; *cordipennis* (although somewhat aberrant) I refer to *Paleticus*; for *annulipes* (the tarsi of which are very different to those of *subereus* or *cordipennis*) a new genus is required.

Paleticus is allied to *Poropterus*, but it is abundantly distinct from that genus by the two basal segments of abdomen being

elytra, teeth of intermediate femora very feeble, the others small but acute. Length 11½, rostrum 3½; width 6; variation in length 10½-12 mm.

Hab.—"Queensland" (Pascoe). N.S.W.: Tweed and Richmond Rivers (Lea).

As I have not been enabled to positively identify ***laticollis*** I have taken this species as typical of the genus.

PALETICUS ARCIFERUS, n.sp.

Colour and clothing much as in the preceding, except that the small scales are much more numerous and that there are two transverse fascicles on each elytron, and several small irregular tufts scattered about.

Head with a longitudinal carina in middle, on each side of it a feeble elliptic oblique tubercle. Rostrum long and thin, excavated in middle of base and on each side so that at near base it appears to be quadricostate, towards apex obsoletely punctate and shining. Second joint of funicle about once and one-half the length of 1st. *Prothorax* transverse ($3\frac{2}{3} \times 2\frac{3}{4}$), feebly convex, apex rounded, basal three-fourths almost parallel, base strongly bisinuate. *Scutellum* indistinct. *Elytra* cordate, sides rounded, widest slightly before the middle, subtuberculate on each side of scutellum, shoulders feebly produced and subtuberculate, basal half and sides punctate but punctures almost concealed. *Legs*

Tibiæ hooks longer [illegible]de, and one on each side of median
Second joint of [illegible] interstices irregularly fasciculate, but
Second joint of [illegible]le on each side at summit of posterior
than [illegible]
Prothorax more or less [illegible]s sides the scales are paler, and towards
Scutellum [illegible]may to run in rows. Under surface and
Scutellum [illegible]more than above; head and basal half of
Elytra [illegible]
Elytra [illegible]

PALETICUS [illegible] in preceding, except that the rostrum is [illegible]punctate. Two basal joints of funicle equal,

Black, opaque [illegible] slightly longer than 2nd. *Prothorax* flat, red, tarsi [illegible] apical sixth rounded, sides almost parallel. ferruginous [illegible] *Elytra* not much wider than prothorax, adpressed to [illegible]y rounded and subarcuate towards apex, disc on the [illegible] with moderately large punctures in feeble across [illegible] sutural row is indistinctly continued to apex, irregularly [illegible] feeble rows of punctures; subtuberculate on [illegible] scutellum; shoulders very feebly produced and feeble [illegible]culate. *Legs* long; femora feebly (the intermediate Under [illegible]y) dentate, posterior terminating at apex of abdomen [illegible] elytra. Length 10, rostrum 3; width 5 (vix) mm.

Hab.: [illegible]ueensland: Cooktown (Herr J. Faust).

impr[illegible] [illegible]ect species on account of the relative lengths of the two medi[illegible] [illegible]nts of funicle and its subparallel form. *P. laticollis* imp[illegible] [illegible] it (according to the description) in the funicle, but is str[illegible] [illegible]d as being flattened about the scutellum and with very s[illegible] [illegible]t clothing. In the figure of that species also the posterior [illegible] [illegible]are made to terminate considerably before the apex of [illegible]

PALETICUS QUADRATICOLLIS, n.sp.

[illegible]olour and clothing much as in *pedestris*, except that the small [illegible]es are more numerous, and that there is but one fascicle on [illegible]h elytron.

Head with three feeble elevations on vertex; transversely impressed and with a small deep fovea between eyes. *Rostrum* long, comparatively stout, feebly incurved to middle, scul

entirely concealed on basal half, apical half feebly shining and with numerous minute punctures. Second joint of funicle about once and one-third the length of 1st. *Prothorax* apparently slightly longer than wide, but in reality feebly transverse ($5 \times 4\frac{1}{2}$), almost flat, apical fifth rounded, sides almost parallel, base strongly bisinuate, scutellar lobe acute. *Scutellum* indistinct. *Elytra* very large, base strongly bisinuate, widest about middle, sides near apex rather suddenly arcuate; basal half with five transverse series of large punctures, sides with four rows of distinct punctures; shoulders produced, oblique and tuberculate; each side of scutellum subtuberculate. *Legs* long; femora thickened, almost edentate, posterior terminating level with suture of 4th and 5th abdominal segments. Length $13\frac{1}{2}$, rostrum 4; width $6\frac{1}{2}$ mm.

Hab.—N.S.W.: Richmond River.

The femoral teeth are represented by minute nodules, scarcely distinguishable on any but the anterior femora, and then only from certain directions. The rostrum is stouter than is usual.

PALETICUS SUBEREUS, Pasc.; Mast. Cat. Sp. No. 5488.

(*Petosiris subereus*, Pasc).

Colour as in *pedestris*. Rather sparsely clothed with small round dull ochreous scales, and with larger and darker scales moderately densely distributed at apex of and forming four feeble

Scutellum indistinct. *Elytra* cordate, impunctate, shoulders produced and tuberculate, a tubercle on each side of scutellum, and one on each each side behind it at about one-fifth from base, each side of suture at base with a row of from three to five small flattened and shining granules. *Legs* long; femora stout, strongly dentate, posterior passing apex of elytra. Length 7½, rostrum 2¾; width 4½; variation in length 7¼-10 mm.

Hab.—Coastal Districts of Queensland and Northern New South Wales.

An exceedingly abundant species in the tropical scrubs, and of which it is not unusual to capture entirely abraded specimens. The male differs from the female in being narrower, rostrum shorter, stouter and feebly tricostate at base, and the scape inserted slightly nearer to apex of rostrum.

PALETICUS FRONTALIS, Pasc.; Mast. Cat. Sp. No. 5456.

Colour as in *pedestris*, except that the antennæ and tarsi are somewhat paler. Densely clothed with small ferruginous-brown scales, interspersed with larger ones, which on the prothorax are somewhat irregular but nowhere fasciculate, on the elytra they form rows (less noticeable towards the base) on the interstices. Scales of under surface somewhat irregular and slightly darker than above; tibiæ scarcely visibly annulate. Head and basal half of antennæ densely squamose.

Head with four shallow impressions leaving three elevated lines, transversely impressed and foveate between eyes; eyes more coarsely faceted than usual. Rostrum long and thin, basal half tricarinate; median carina shining, apical half feebly punctate and shining. Second joint of funicle about once and two-thirds the length of 1st. *Prothorax* strongly transverse, convex, apex rounded, basal two-thirds parallel-sided. *Scutellum* indistinct. *Elytra* briefly subcordate, considerably wider than prothorax, basal half subparallel, base trisinuate; shoulders produced, oblique, basal half with strong punctures placed in transverse rather than in longitudinal series. *Legs* long; femora subclavate, rather

strongly dentate, posterior passing apex of elytra. Length 5½, rostrum 1⅝; width 3 mm.

Hab.—Coastal Districts of Queensland and Northern New South Wales.

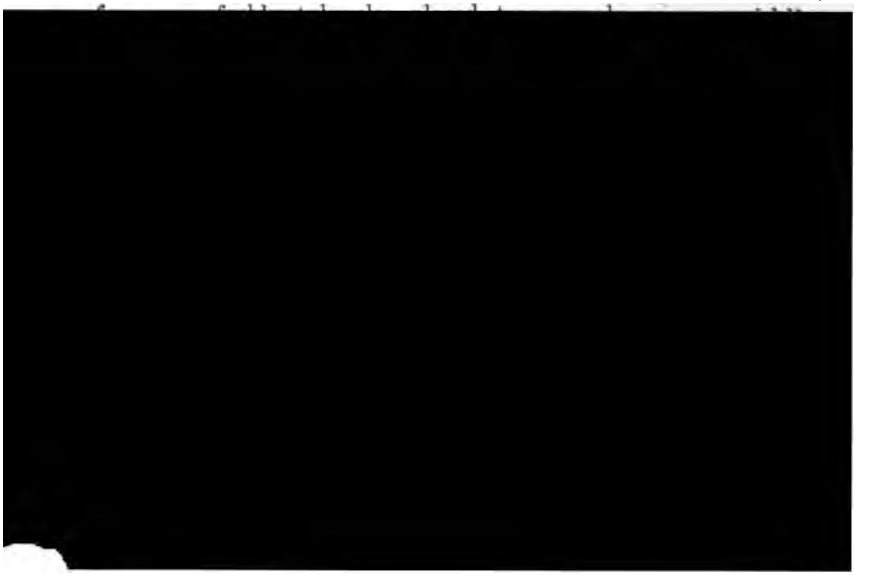
A moderately common species. The male has a shorter and stouter rostrum than the female, and the antennæ are inserted slightly nearer the apex. The elytra about the scutellum and shoulders are not tuberculate. Mr. Pascoe appears to have regarded the frontal impressions as rather an unusual character; they are, however, noticeable in all the species of *Paleticus* and many allied genera.

PALETICUS CORDIPENNIS, Pasc.; Mast. Cat. Sp. No. 5487.

(*Petosiris cordipennis*, Pasc.).

Colour as in *pedestris*. Rather densely clothed with small ferruginous-brown scales, larger and fasciculate on tubercles. Legs with longer scales; head and basal third of rostrum densely squamose.

Head with three feeble elevations, a transverse impression between eyes. Rostrum long, feebly incurved to middle, base tricostate, apical half feebly punctate and shining. Second joint of funicle about once and one-half the length of 1st. *Prothorax* strongly transverse, convex, basal two-thirds scarcely parallel;



REVISION OF THE GENUS PAROPSIS.

By Rev. T. Blackburn, B.A., Corresponding Member.

Part III.

[Commencing the treatment of the species forming Group VI. (as characterised in P.L.S.N.S.W. 1896, p. 638) of the genus.]

To deal successfully with this enormous aggregate it seems necessary to begin by breaking it up into subgroups, which, however, is a very difficult task, as it is scarcely possible to specify structural characters that can be absolutely relied upon singly to characterise sharply defined sets of species. Nevertheless when one has an extensive series of species under observation there is not much difficulty in grouping them, although the difficulty remains of putting down on paper in a satisfactory form the characters that distinguish each aggregate. The following is the best and most easily characterised arrangement I can suggest. First, there is no difficulty in separating a small group of small species (which I think should be placed at the end) having the head very strongly produced in front of the eyes. Next, a study of the elytral sculpture reveals four distinct types of puncturation and

these well defined foveæ are found in scarcely any species outside this subgroup. The prothoracic foveæ become obsolete in a few species, but in these (with one exception) there is no carination of the suture, and this flatness of the suture I do not find elsewhere except in one of the small subgroups (which I place second in the group) already characterised by another distinctive feature, and a few very small species which obviously belong to another subgroup. The exception mentioned above is *P. variabilis*, Chp., which seems to form a connecting link between this subgroup and those having the suture carinate behind, as it has no defined prothoracic foveæ and the suture feebly carinate behind (more distinctly in some specimens than others), but it clearly belongs to this subgroup rather than the later ones.

The species remaining, after those already characterised have been removed, fall fairly naturally into two subgroups, one of them consisting of species somewhat variable in form and colouring but in general not strongly convex and with a tendency to distinct patterns on the elytra,—the colours being non-metallic and not evanescent after death,—and the texture of the elytra generally firm and not in the least transparent; the other consisting of species usually more convex, with coloured markings (absent in some species) metallic and evanescent after death, and the texture of the elytra more fragile. Between these two subgroups it is not at all easy to specify good workable distinctions,

than in the series; from the 4th and 5th it can be at once separated by most of its species having both (*a*) deep and well defined prothoracic foveæ, (*b*) the suture of the elytra not carinate behind, and all of them—except a single aberrant form *P. variabilis*, Chp.) which is specially treated below—having one or other of those characters in a very pronounced degree; and from the 6th subgroup it is readily distinguished by the head not being produced n front of the eyes more than is usual among the *Paropsis* in general. It is further distinguished from most of the other subgroups by its not containing any very small species and very few not decidedly large.

With regard to the species constituting this subgroup, I find that (including the new species described below) there are probably* 51 names that have been applied to them. Of these, however, it seems quite possible that one (*deflorata*, Chp.) may represent a member of some other subgroup. I have not seen any insect which I can specify as the one described, and the description of the prothorax is ambiguous. Chapuis generally uses of the prothorax of species of this subgroup some such phrase as "fovea profunda ornato," but of this he says "ad latera distincte foveolato," and adds "et punctato rugoso." This suggests to my mind rather the idea of a species of the 5th subgroup in which the vague light impression often present among much rugulosity is a little more pronounced than usual than one of the

G. The upper surface black or variegated with black and red.
H. The interstices of the elytra alternately flat and convex vittipennis, Bohem.
HH. The interstices of the elytra uniform.
I. The interstices of the elytra convex (at any rate in the ♀)..... mera, Chp.
II. The interstices of the elytra flat.
J. Prothoracic foveæ large, and elongated towards front margin.
K. The elytra with a red margin sharply defined continuously to the apex.
L. The prothoracic foveæ are on the red part of the segment..... beata, Newm.
LL. The prothoracic foveæ are on the black part of the segment..... dulcior, Blackb.

FF. Legs testaceous-brown ..... complexa, Chp. (?).
EE. The interstices of the elytra notably convex in the ♀..... gemina, Chp.
DD. Antennæ very slender, their middle joints much longer than wide..... intacta, Newm.
CC. Basal joint of anterior 4 tarsi in male narrower, but little narrowed at apex, its sides little rounded.
D. Legs testaceous.
E. Elytral interstices with sharply defined black blotches..... ..... interlita, Newm.
EE. Elytral interstices not blotched with black.
F. Elytral interstices variegated with contrasted shades of brown and testaceous..... insignita, Newm.
FF. Elytral interstices uniformly testaceous..... trimaculata, Chp.
DD. Legs black..... ... .. nucea, Er.
AA. The prothoracic foveæ faintly defined or even wanting.
B. General colour black, or brassy or bluish black.
C. Basal joint of anterior 4 tarsi of ♂ very large, as wide as and much larger than 3rd joint..... irina, Chp.
CC. Basal joint of anterior 4 tarsi of ♂ moderate, narrower and not much

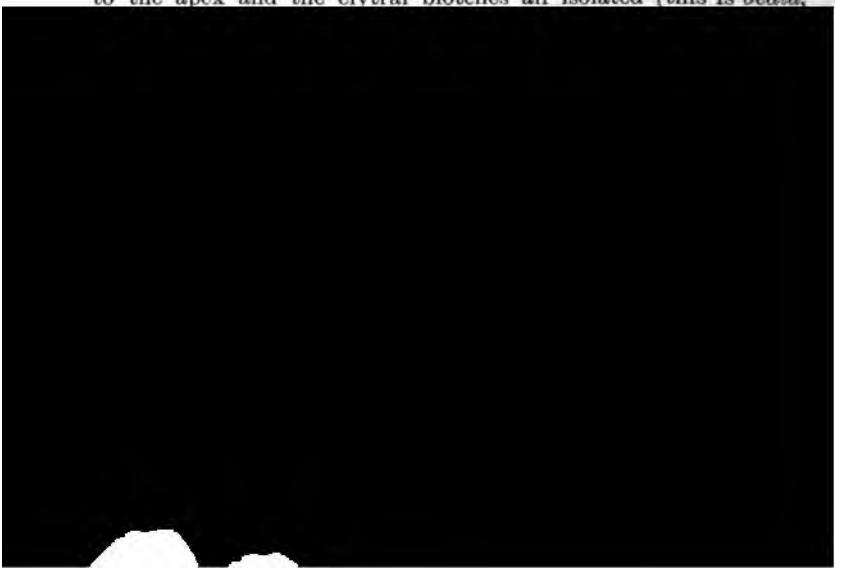
—manifestly less fine than in *rubrosignata*, Bohem., *sexpustulata*, Marsh., &c. The interstices are almost flat in the male, slightly convex in the female. In the male the basal joint of each of the four anterior tarsi is very much dilated, and the apical ventral segment is deeply and largely declivous behind, the declivous portion reaching forward further in the middle (where it comes not far from the base of the segment), thus appearing like a kind of semicircular excavation (the front outline of which, however, from a certain point of view is subangular in the middle).

I believe *fallax*, Newm., to be a var. of this species. I have examples from Victoria and S. Australia which agree well with the description of *fallax*, and although they seem to be a trifle more depressed and slightly less rounded on the sides than typical *morio*. with the concavity on the apical ventral segment of the male not reaching quite so far forward and having scarcely (or not) any appearance of angularity in front, I cannot look upon them as representing a distinct species.

I have described *P. morio* somewhat fully, because it is desirable to have a few easily recognised species with which others can be compared or contrasted, and this is an easy one to identify, being common and widely distributed, and, though variable in colour, well distinguished by the ventral characters of the male, no other species that I have seen (of those at all nearly resembling it

P. BEATA, Newm. (*rubrosignata*, Bohem.; var. *testaceiceps*, Blackb.)

Var. *rubrosignata*, Bohem.—I have examined a good many specimens of this insect, and cannot find any reason to regard it and *beata*, and also another form described below, as anything but varieties of a species that assumes very widely diverse colour and markings, and even presents some puzzling uncertainties of sculpture. The constant characters are: form moderately convex, the males subcircular, the females broadly ovate—sculpture very fine throughout with seriate and interstitial puncturation of elytra not or scarcely different *inter se*, the elytra non-striate in the males, but usually with obsolete scratch-like striæ in the females; prothorax with a large moderately deep fovea on either side widely remote from the lateral margin; four anterior tarsi of males with the basal joint well dilated; apical ventral segment of male feebly declivous hindward at extreme apex with its hind-margin subtruncate; head more or less red, sides of prothorax and elytra always red or yellowish-red, the latter bearing red or testaceous blotches on the disc, which are normally 3 (never more) on each elytron, but coalesce in almost infinitely various ways (in an extreme var. uniting to form one large blotch occupying the whole disc). In Victorian examples the underside and legs are usually black, the elytral red margin evenly continuous to the apex and the elytral blotches all isolated (this is *beata*,



base and two smaller ones of somewhat similar form placed transversely near the apex. In *beata* (and all its vars.) the front blotch is more or less triangular (its apex near the lateral margin) and the elytra have a wide red lateral border. As I have seen no examples that can be called intermediate, I think the two may be considered distinct.

P. OCTOSIGNATA, Stäl.

The four spots on the elytra of this species seem to be constant. The colour is subject to a good deal of variety, some examples being (except the elytral spots and the vertex) entirely black, some having the prothorax laterally or wholly brownish, others having the elytra piceous, and others again the lateral and apical parts of the elytra brownish.

P. SEMIVITTATA, sp.nov.

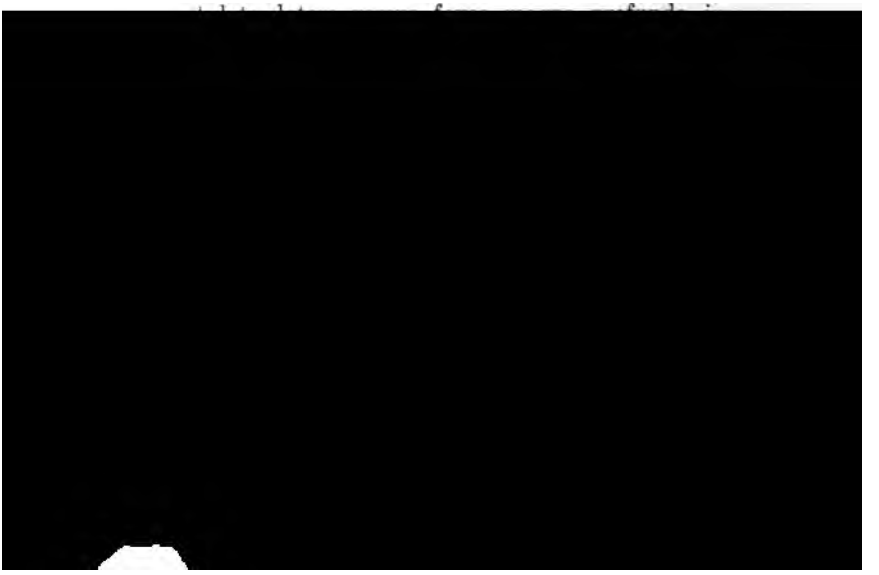
Modice convexa; nitida; nigra vel nigro-picea, capite prothorace (hoc vage piceo-adumbrato) antennis pedibus (his plus minusve infuscatis) et in utroque elytro vittis 10 (his plus minusve interruptis, alternis conspicuis alternis subobsoletis) lividis: capite prothoraceque subtiliter sat crebre punctulatis; hoc quam longiori ut $2\frac{7}{10}$ ad 1 latiori, ab apice ultra medium dilatato, latera versus fovea magna profunda impresso, lateribus sat arcuatis, angulis posticis rotundatis; scutello lævi;

developed which is found also more or less conspicuously in a good many of its allies, viz., 10 rows of punctures (of dark colour and much larger than those of the upper surface) on the *under* surface of the elytra which show through (especially if the elytra be wetted with benzine) and to a casual glance make the elytral sculpture appear very different from what it really is. I think the more or less distinctness of this pseudo-sculpture depends much on the action of alcohol. There is also a certain variability (not sexual) in the *genuine* puncturation of the upper surface in specimens taken under circumstances that establish their specific identity—some being though very finely yet quite distinctly punctulate and others almost devoid of puncturation. The colour of the upper surface varies from orange-brown to piceous-red; the prothorax is in some examples a little mottled with darker and lighter shades of brown, and the marginal parts of the elytra tend to be somewhat lighter than the disc with the extreme margin (the actual edging) very narrowly piceous. The antennæ are dark brown with the basal part lighter, the legs usually brown with the femora more or less infuscate. The under surface varies from brown to dark piceous. *P. Clotho*, Stäl, is, I have no doubt, a later name for this insect. I have an example named ***Clotho*** by Dr. Chapuis which is evidently identical with the type of ***brunnea*** in the Macleay Collection. There is no very noticeable difference in the sexes except the usual tarsal character,—the dilated joints

impressions appearing gibbous or almost tuberculous. This species is also notable for the unusually (among its near allies) coarse puncturation of the submarginal part of the elytra. I have taken these various forms together under circumstances that allow no doubt of their specific identity. The colour-differences are not sexual. The fovea on either side of the prothorax is very well marked and deep, but smaller than in most of the allied species. The suture is carinate in a short portion of the hinder part of its length. I suspect *æqualis*, Chp., of being a variety of this species, but cannot definitely assert it to be so, as I have not seen a specimen quite agreeing with the description in respect of colour, although I have one differing only in having the femora not quite dark enough in colour. *P. æqualis* is attributed by its author to Gippsland, where *stygia* in all its varieties is a common insect. I have the insect from various localities in Victoria, and a single example from N.S. Wales.

P. ANGUSTIPES, sp.nov.

Ovata; modice lata; nitidissima; nigra, antennis subtus basin versus testaceis, nonnullorum exemplorum capite postice picescenti; capite crebrius subtilius punctulato; prothorace quam longiori ut plus quam $2\frac{1}{2}$ ad 1 latiori, ab apice fere ad basin dilatato, crebre subtilissime (ad latera sparsius fortiter)



these slight differences in prothoracic sculpture are neither specific nor sexual. The elytral interstices are perfectly flat in the male. In the female they are nearly flat but not quite so absolutely as in the male. The females moreover are a little narrower and less rounded on the sides than the males. The size is: long. $4\frac{1}{2}$-6, lat. $3\frac{1}{8}$-$4\frac{2}{3}$ lines. The variation in colour is almost infinite, but in all the examples I have seen the prevailing colour both above and beneath is black.

The form *nigerrima*, Germ., is widely distributed and is entirely black except a red spot between the eyes and a little testaceous colouring about the base of the antennæ on the underside. Then we find examples in which also the sides of the prothorax and some spots on the alternate interstices of the elytra are red, then examples in which also the lateral margins of the elytra are red (and some in which the lateral margins are red without any spots on the interstices), then examples (*alternata*, Germ.) in which the prothorax is all black but the alternate interstices of the elytra are entirely red, then examples (mentioned by Germar) differing from *alternata* in having the sides of the prothorax red, then examples (*picta*, Chp.) in which the prothorax is blotched with red (or even more red than black) and the elytra bear red spots not confined to the *alternate* interstices and even in extreme varieties coalescing into large transverse blotches. I must admit that in the last mentioned form the style of elytral marking is so different from that of the other varieties as to suggest specific distinctness, but I have vainly examined numerous specimens in search of some constant structural difference. I have not seen the form *picta* except from W. Australia. Specimens named "*nigerrima*" and "*picta*," by Chapuis are before me.

P. MENTITRIX, sp.nov.

♀. Sat late ovata; sat convexa; sat nitida; ut *P. rufobrunnea*, Blackb colorata, capite crebre subtilius punctulato; prothorace fere ut *P. rufobrunneæ* sed angulis anticis acutis sat productis; elytris 10-striatis, striis concinne (quam *P. geminæ*, Chp. vix minus fortiter punctulatis, interstitiis planis (vel vix sub-

datis; elytris haud striatis, subtiliter minus distincte 10-seriatim punctulatis, interstitiis planis crebre subtiliter (suturam versus vix, latera versus manifeste, quam series magis subtiliter) punctulatis, parte marginali quam series externa vix magis fortiter punctulata; tarsorum anticorum 4 articulo basali minus dilatato ad latera minus rotundato; antennis robustis, articulis 5-8 quam latioribus haud multo longioribus. Long. $4\frac{2}{5}$, lat. $3\frac{3}{5}$ lines.

♀. Latet.

Its strongly convex and almost subcircular form render this species somewhat isolated among those having well defined prothoracic foveæ. It is perhaps most like pale examples of *P. liturata*, Marsh., which it closely resembles in puncturation and from which it is most easily distinguished by its antennæ suddenly blackish after the 4th joint and having the blackish joints rather strongly compressed.

Queensland; sent to me by Mr. French.

P. NIGERRIMA, Germ. (var. *alternata*, Germ.; var. ? *picta*, Chp.)

I regard *alternata*, Germ., and *picta*, Chp., as varieties of this species, and it is very unfortunate that all three names are founded on the colours of particular varieties and therefore unsuitable as specific names. The species is easily distinguishable among those of dark colour and having strongly defined foveate impressions on

ne vittæ (except the marginal one) are wanting, in the second they are all interrupted except the marginal one, the third has four entire vittæ as stated in the description. The underside varies from testaceous to piceous. The species is very close to *nigerrima*, Germ., but in the latter the legs seem to be invariably black, and I have not seen any variety of it coloured as the present species on the upper surface.

P. GEMINA, Chp.

This is another extremely variable species. It is common in the neighbourhood of Adelaide. The dark marks on the prothorax vary from a good-sized blotch on either side of the disc through various forms having the intermediate space more or less filled in with dark clouds and blotches till in the extreme form the whole space between the foveate impressions is black. The elytra in lightly coloured examples have ten black striæ (much like those of *intacta*, but) more or less faint or abbreviated in the neighbourhood of the humeral callus, and vary through forms in which the black of some of the external striæ becomes dilated till it even fills up the whole width of some of the interstices in a more or less blotchy manner, to the extreme form known to me, in which the alternate interstices are entirely black. This extreme form resembles the var. *alternata* of *nigerrima*, from which, however, it is quite distinct by the considerably coarser punctures of its elytral series, as well as by the evident *striæ* in which the elytral series are placed and the very marked convexity of the interstices in the female.

P. INTACTA, Newm. (*polyglypta*, Germ.; *Froggatti*, Blackb.)

In Trans. Roy. Soc. S.A. I expressed the opinion that *P. polyglypta*, Germ., is distinct from *intacta*, Newm., and described under the name *Froggatti* another form (from the Australian Alps) as an allied new species. A careful consideration of the long series of *Paropsis* now before me compels me to abandon the opinion that the above names represent distinct species, as I find that the three forms are connected by intermediate varieties.

convexis) vix perspicue (vel subtilissime) punctulatis; ceteris ut *P. rufobrunnea*.

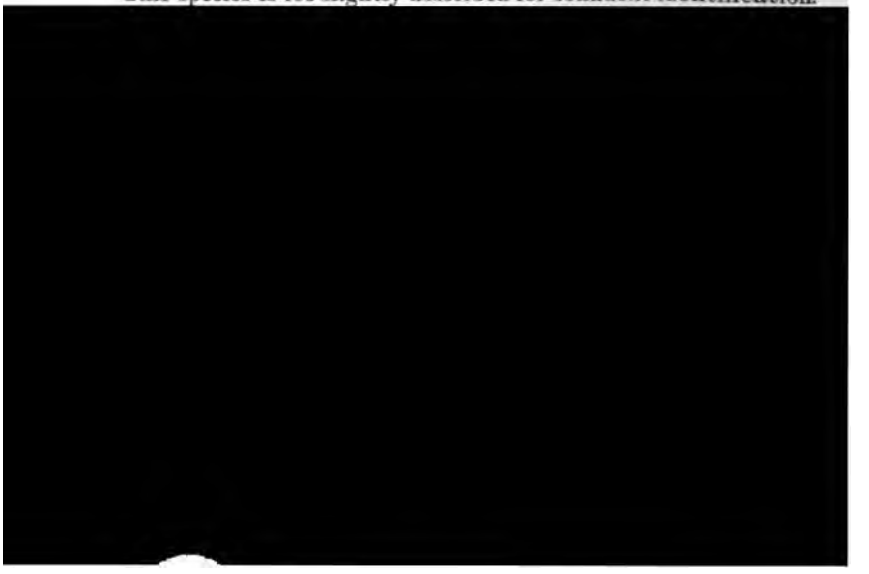
♂. Latet.

The remarkable resemblance of this species in colour and markings to *P. rufobrunnea* (Chp.) Blackb., is so close as to make one hesitate to consider it a distinct species, but its structural characters are too well marked to allow of its being called a mere variety. Compared with *rufobrunnea* it is considerably more convex and much more nitid, with the front angles of the prothorax acute, and the puncturation of the elytra quite different. I have seen three specimens of this insect all quite identical and a good many of *rufobrunnea*, but no intermediate forms. If such structural differences are possible within the limits of a species it is difficult to say whether *any Paropsis* is a good species. In placing this species in the tabulation I have assumed that the sexual characters of the male are similar to those of *rufobrunnea*, if the basal joint of the anterior tarsi is narrower the species would stand near *nucea*, Er., from which its notably larger size, elytral interstices scarcely convex in the ♀, and different colouring render it very distinct.

N.S. Wales; from several localities.

P. COMPLEXA, Chp.

This species is too slightly described for confident identification.



The type of *Froggatti* certainly seems to differ from all the other examples I have seen by the strong convexity of its elytral interstices, but I am disposed to think it an abnormal specimen as I have since seen examples from the same locality in which the interstices are not convex. *P. intacta* (including *polyglypta* and *Froggatti*) may be known (among the *Paropses* having strong prothoracic foveæ and 10 strongly defined elytral striæ) by its long slender antennæ in combination with very strongly dilated basal joints to the 4 anterior tarsi of the ♂, those of the intermediate and front tarsi being similar to each other. Its upper surface varies from testaceous to a clear brown, the head bears a black spot of variable size between the eyes, the prothorax has a large discal black spot and a smaller one (or two placed longitudinally and connected or not) on either side, the elytra bear 10 well-defined black punctulate striæ, the interstices are unicolorous and usually more distinctly punctulate in the male than the female, the under surface varies from testaceous to black, the legs are testaceous, the antennæ are testaceous near the base and

that on the head to become obsolete. The extreme variety in a long series before me has the upper surface *testaceous*-brown. The marginal region of the elytra is in many examples of lighter colour than the disc. I have several specimens named by Dr. Chapuis. The elytral interstices are scarcely (♂) or distinctly (♀) convex. The species inhabits Tasmania, Victoria, and N. S. Wales.

P. SUBCINCTA, sp.nov.

Fortiter convexa; nitida; nigra vix ænescens, antennis (his apicem versus infuscatis) labro palpis tarsis (nonnullorum exemplorum tibiis) et prothoracis elytrorum abdominisque lateribus (anguste) rufo-testaceis; capite brevi fortius minus crebre punctulato, sutura clypeali minus distincta; prothorace quam longiori ut $2\frac{3}{4}$ ad 1 latiori, ab apice fere ad basin dilatato, latera versus fovea leviter impressa (vel vix manifesta) instructo, lateribus modice arcuatis, angulis posticis obtusis, disco subtiliter (lateribus fortiter sat crebre) punc-

among its congeners of the group having 10 rows of punctures on the elytra are: prothoracic foveæ small and lightly or scarcely impressed, antennæ very unusually robust (their joints 5-10 strongly compressed, and scarcely longer than at the apex wide), elytral series of punctures very feeble, prothorax testaceous or red (always in my experience with a black spot of varying size and shape on the middle of the base, and in some examples with other spots), elytra variegated in almost infinite diversity with red and black. The size ranges from: long. 3½ to 5 lines. The smallest examples before me are all from N.W. Australia; the largest from Central Australia. Specimens from a given locality generally resemble each other in colour and markings more than they do specimens from other localities, which perhaps points to a possibility that I am including more than one good species under this name. The prothorax in the type (which seems to occur only near Sydney, and of which I have an example that has been compared with the reputed original type in the Macleay Collection) has its median basal spot trilobed and comparatively large and an additional spot on each side; specimens from all other localities have only the central spot on the prothorax, which is large and usually trilobed in Queensland examples, but much smaller and not trilobed in examples from Central and N.W. Australia. The elytral markings are at their minimum in examples from N.W. Australia, in which they consist

ings on the elytra differs from the Sydney type only in having the postmedian blotch and the subapical connected (a little within the suture); then comes a form in which the two postbasal and the four posterior spots respectively are united into two large blotches; then a form in which the postbasal and postmedian spots are united (each set) into a large blotch extending to both suture and lateral margin and there coalesce with each other and with the subapical blotch (so that the elytra might be described as black with two discal transversely sinuate blotches of red); then a form in which all the black markings except the intermediate one of the postmedian three coalesce widely on the suture and lateral margin (so that the elytra are black with a large discal red spot, in the centre of which is a small black spot); and finally a form in which only a small piece of the interval between the postbasal and postmedian sets of spots remains red. The under surface is almost entirely testaceous in examples with the minimum of dark colouring on the elytra, but the middle of the breast and abdomen is blackish in those having much black colouring on the elytra. The legs vary from testaceous to black (with many intermediate colourings). The antennæ are always black (except near the base).

P. BADIA, sp.nov.

Fortiter convexa; brevis; lata; sat nitida; rufo-testacea, elytris maculis parvis piceis 2 (altera in callo humerali, altera submarginali postmediana) ornatis, elytrorum striis brunneis, antennis apicem versus picescentibus; capite brevi, lato, crebre subtilius punctulato; prothorace quam longiori fere ut $2\frac{1}{3}$ ad 1 latiori, crebre subtilius (ad latera multo magis fortiter) punctulato, utrinque fovea magna leviter impresso, lateribus fortiter arcuatis, latitudine majori basin versus posita, angulis posticis fere nullis; elytris vix striatis, fortius 10-seriatim punctulatis, interstitiis planis crebrius minus subtiliter punctulatis, parte marginali quam series paullo magis fortiter punctulata; antennis sat gracilibus, articulis 3-11 vix compressis quam latioribus multo longioribus.

♂. Fere subhemisphærica, tarsorum anticorum articulo basali sat dilatato (quam *P. intactæ*, Newm. sat minore) intermediorum perspicue magis angusto.

♀. Latissime ovata. Long. 5, lat. 4 lines (vix).

An isolated species which does not look at home in this subgroup, but seems to be nearly allied to *P. variabilis*, Chp. Its prothoracic foveæ, however, though feebly impressed and its flat elytral suture require it to be placed here. I have seen only two examples (both in my own collection), and judging from them I should say that the two very conspicuous blackish spots on each elytron which are very sharply defined and probably constant might be relied upon to render this an easily recognisable species.

S. Australia; Eyre's Peninsula.

P. NIGROVITTATA, Chp.

This species is uniformly testaceous or testaceous-brown, except on the elytra, where the seriate punctures run on narrow black lines. It is of very strongly convex subhemispheric form and

will be mentioned again among those of the 4th subgroup. Its size is: long. 4½-5 lines. It occurs in South and West Australia. I have an example named by Dr. Chapuis.

P. PACHYTA, sp.nov.

A rare species in my experience. I have an example named by Dr. Chapuis. It is entirely of testaceous colour. The prothorax is without foveæ, and is somewhat widely explanate at the sides. The suture is non carinate. Its size is 4½ lines. It occurs in N.S. Wales.

P. INCERTA, Chp.

Dr. Chapuis says that this is *testacea*, Marsh., (nom. præocc.). I am unable to verify this statement, as *testacea* is absent from the specimens in the Macleay Collection which are believed to be Marsham's types. I have an example named by Dr. Chapuis which is the smallest example I have seen of this subgroup (long. 3½ lines). It is extremely close to *pachyta*, Chp., (only doubtfully distinct in my opinion), but the example before me has the sides of its prothorax less noticeably explanate.

P. GRACILIPES, sp.nov.

Ovata; fortiter convexa, fere subgibba; sat nitida, capite prothoraceque subopacis exceptis; testaceo-brunnea, antennis apicem versus paullo infuscatis; capite crebre subtilius nonnihil aspere punctulato; prothorace quam longiori fere ut 2½ ad 1 latiori, fere ut caput sed paullo magis crebre (ad latera paullo magis fortiter) punctulato, utrinque late leviter planato sed vix manifeste foveolato, lateribus leviter arcuatis, latitudine majori fere ad basin posita, angulis anticis acutis sat prominulis posticis subrotundatis; elytris vix striatis, distincte 10-seriatim punctulatis, interstitiis planis subtiliter punctulatis, parte marginali ut series punctulata; antennis sat gracilibus; prosterno haud canaliculato; tibiis anticis sat gracilibus.

♂. Tarsorum anticorum 4 articulo basali minus fortiter dilatato.

Long. 4, lat. 3 lines.

The comparatively slender and elongate front tibiæ of this species suggest a doubt whether it might not be regarded as generically distinct from *Paropsis*, but I cannot find any other peculiarity on which to found a new genus. It is the only species known to me of this subgroup having the prosternum not sulcate, but that character is found also in several isolated species pertaining to other aggregates in the genus and not otherwise resembling the present one. The apical joint of the maxillary palpi is of the form that seems to characterise *Paropsis* essentially among its near allies.

N. S. Wales; Richmond River; taken by Mr. Lea.

SUBGROUP II.

In this subgroup the punctures in the elytral series are more or less irregularly placed; the interval between puncture and puncture is at least considerably greater than the diameter of a puncture and is for the most part as great as the width of th[illegible] interstice. In most of the species the fine interstitia[illegible]lf to the intervals between puncture ar[illegible]les seems to be there [illegible]all cc

B. The elytral series run very conspicuously in pairs ..... nupta, Blackb.
BB. The elytral series not placed in pairs.
C. The highest part of the elytra very elevated and notably in front of the middle of the lateral outline (viewed from the side)..... remota, Germ.
CC. Elytra less convex and with the greatest height not nearly so far forward.
D. Antennæ with joints 5-10 much compressed, and black or nearly so.
E. The scutellum, and 2 spots on the head, black.. ..... stictica, Marsh.
EE. Scutellum testaceous; head without black spots ..... inspersa, Newm.
DD. Antennæ filiform or nearly so; testaceous or scarcely infuscate.
E. Head nitid, and not punctured particularly closely ..... madida, Blackb.
EE. Head opaque owing to very close puncturation..... opaciceps, Blackb.

P. TESSELLATA, Clk.

There is an element of doubt about my identification of this species inasmuch as I have not seen an authentic type, and the specimens which I regard as *tessellata* were not taken in Western Australia (the locality cited by Clark) but in South Australia, on Eyre's Peninsula. These specimens, however, agree so well with the description (especially in respect of the elytral markings, which are quite different from those of any other species known to me) that I feel fairly confident in naming them. It is noteworthy, however, that Clark does not mention the submarginal sulcus of the prothorax which seems to be the principal structural distinction of the species among its near allies. Clark, however, does not compare it with any other species of this subgroup, which may account for his not mentioning the sulcus. The insect is about 3½ lines long with filiform testaceous antennæ. The elytra are pale fuscous with about 10 rows of somewhat square testaceous blotches on each of them, each row containing about 10 of the blotches and each blotch having in its centre a piceous puncture.

P. NUPTA, sp.nov.

Breviter ovata; valde convexa; nitida; testacea, antennis (basi excepta) palpis genubus tarsis macula frontali biloba scutello humeris et elytrorum punctis seriatis nigris; capite latissimo perbrevi, crebrius subtilius punctulato; prothorace quam longiori ut fere $2\frac{1}{2}$ ad 1 latiori, crebrius subtiliter (ad latera sat grosse) punctulato, latera versus fere æquali, lateribus leviter arcuatis, latitudine majori fere ad basin posita, angulis posticis fere nullis; elytris haud striatis, geminatim 10-seriatim punctulatis, puncturis in seriebus sparsis, interstitiis planis subtiliter minus crebre punctulatis, parte marginali quam series paullo minus fortiter punctulata; antennis minus elongatis.

♂. Quam, ♀ brevior. Long. $2\frac{3}{4}$-3, lat. $2\frac{1}{5}$ lines.

This species does not seem to be a variable one; it is easily recognisable by the rows (arranged in pairs) of very conspicuous

"vertice obscuro" which is not a satisfactory description of the black marks on the forehead of *stictica*, and "pedibus ferrugineis," no example that I have seen of *stictica* having the legs entirely ferruginous.

P. NIGROSTILLATA, Chp.

The description of this species mentions no character inconsistent with its being identical with a dark-legged example of *inspersa*, Newm., of which I have no hesitation in considering its name a synonym.

P. MADIDA, sp.nov.

♀. Breviter ovata; fortiter convexa; nitida; testacea, elytrorum puncturis seriatis nigris; capite latissimo, perbrevi, crebrius subtiliter punctulato; prothorace quam longiori ut $2\frac{1}{2}$ ad 1 latiori, crebre subtilissime (ad latera minus subtiliter, nec fortiter) punctulato, latera versus fere æquali, lateribus arcuatis, latitudine majori prope basin posita, angulis posticis nullis; elytris haud striatis, 10-seriatim punctulatis, puncturis in seriebus sparsis, interstitiis planis crebre subtiliter punctulatis, parte marginali ut series vix tam fortiter punctulata; antennis subfiliformibus. Long. $3\frac{1}{2}$, lat. $2\frac{4}{5}$ lines.

The unique type of this species resembles *stictica*, Marsh., in [redacted] of its seriate elytral punctures extending [redacted] less extended than in

other species on whose elytra there is no difference (or scarcely any) between the seriate and interstitial punctures it is because the seriate punctures are unusually fine,—here it is because the interstitial punctures are unusually coarse. To be quite precise, it may be well to note that in the members of this subgroup having the finest elytral puncturation the punctures of both interstices and series on at least the external half of the surface of the elytra are notably less fine than on the elytra of *P. morio*. This subgroup resembles the 1st in having distinct, though not strongly developed, prothoracic foveæ; it resembles the 4th, 5th and 6th in having the elytral suture carinate in at least its hind quarter. There is a species here and there in other aggregates on whose elytral interstices there are some coarse punctures near the apex, or in a few interstices near the outer part of the disc, but none, I think, having (as in the present subgroup) the punctures of each interstice similar to those of the adjacent series throughout. I have found the few species of this subgroup peculiarly hard to tabulate owing to the close alliance of some of

DD. ♂. Elytra black with some of the interstices yellow or red..... ... Io, Blackb.
CC. Elytra not having longitudinal lines of contrasted colours.
D. The principal elytral markings are spots or blotches on the posterior declivity ..... Atalanta, Blackb.
DD. Elytra with (if any markings) only a large subbasal obscure blotch..... interstitialis, Chp.

P. CERNUA, Chp.

This species is one that I have not seen. It is described as of very large size (long. 6½ lines), with the seriate and interstitial punctures of the elytra large and of equal size, and with the seriate punctures very flexuous in arrangement. It is said to occur near Sydney.

P. LIGNEA, Er. (*ornaticollis*, Chp.).

That this is one of the most variable species in the genus I can affirm confidently, as I have taken some of the extreme forms in company with typical examples under circumstances that allowed no doubt of their specific identity. I think it is easy to identify, nevertheless, inasmuch as its being a member of this present subgroup is unmistakable, and in the subgroup it is the only species having the punctures of the elytral interstices *everywhere* as large as (in fact they are a little larger than) those of the adjacent series, all these punctures *very coarse* (in every part of the elytra they are notably coarser than the seriate punctures of the common *P. intacta*, Newm.), and also all these punctures not (or scarcely) coarser in one part of the elytra than in another (*i.e.*, not becoming notably coarser towards the sides or apex of the elytra, except in some examples close to the margin). The punctures of the interstices are more or less seriate in arrangement. It is of ovate, and not particularly short, form, and of only moderate convexity (especially the males) with the greatest height of the elytra (viewed from the side) decidedly behind the middle of the length of the lower outline (*i.e.*, the lateral margin) of the elytra. The puncturation of the prothorax is more or less uneven and

rugulose becoming gradually coarser from the middle of the disc towards the margins, and its hind angles are quite rounded off. The seriate punctures of the elytra run in distinct, but not strongly impressed, striæ; the interstices are flat; and there is generally an unpunctured more or less interrupted wheal-like space between the lateral stria and the confused marginal punctuation. The antennæ are elongate and somewhat robust, but decidedly filiform, all the joints (except the 2nd) much longer than wide, the 3rd joint considerably longer than the 4th. The basal joint of the 4 anterior tarsi of the male is dilated comparatively feebly (with its sides but little rounded) and the apical ventral segment scarcely differs in the sexes. The size is variable (long. 4-5 lines). The head varies from entirely testaceous to testaceous with the vertex and a longitudinal line (which is bifid in front) black. The prothorax varies from entirely testaceous, through forms in which there are obscure fuscous markings, to one (*ornaticollis*, Chp.) in which there are three large black spots placed transversely across the disc and then to

and is entirely testaceous throughout in colour, except a little infuscation of the apical part of the antennæ.

The species is easily distinguished from *P. lignea*, Er., by the puncturation (both seriate and interstitial) of its elytra being quite fine near the suture,—about as fine as in *P. morio*, Fab.,—but becoming gradually coarse towards the lateral margins, where, however, it is still considerably less coarse than in *P. lignea*, and slightly less coarse than the seriate puncturation of *P. intacta*, Newm. The prothorax has better marked prothoracic foveæ than in *P. lignea;* in fact they are better defined than in some species of subgroup i., but there is no fear of confusion with that subgroup on account of the elytral puncturation and the well defined narrow carination of the apical quarter of the suture.

Boisduval's description of *geniculata* agrees with the present species as far as it goes, and seems to have been founded on a specimen taken near Sydney. I therefore claim the name for this insect pending any correction that might result from an examination of the type.

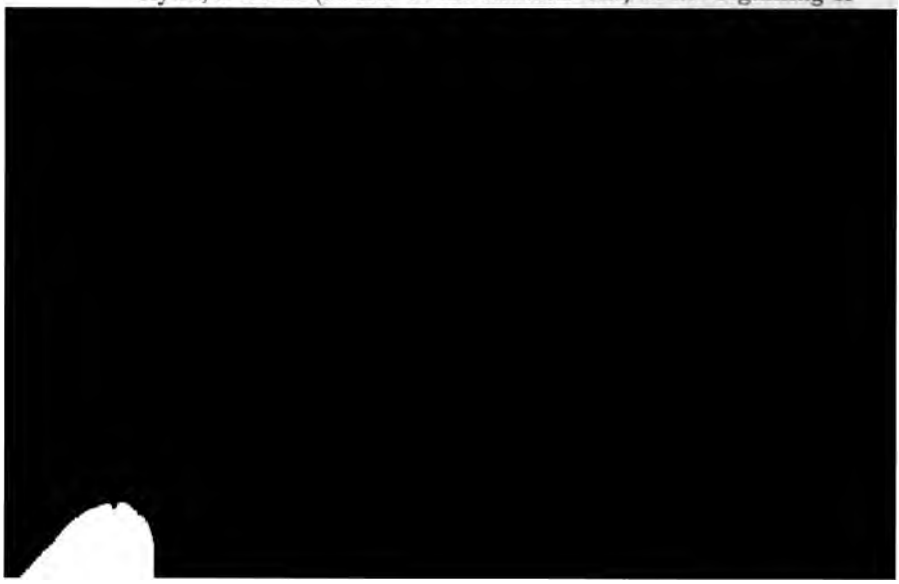
antennis apicem versus et nonnullorum exemplorum femoribus apicem versus et tibiarum basi infuscatis.

♀. In prothorace (exemplis rarissimis exceptis) haud fusconotata. Long. $2\frac{4}{5}$-$3\frac{4}{5}$, lat. $2\frac{1}{5}$-$3\frac{1}{5}$ lines.

This is another species with structural characters very close to those of *P. geniculata* (as characterised above). It is uniformly smaller, always has distinctly traceable elytral striæ, and has a certainly more transverse prothorax. The last of these characters distinguishes it from *P. Io* also, than which species moreover it is smaller, although the largest female of it that I have seen is as large as the smallest male I have seen of *P. Io*.

In colour and markings it differs essentially from both *geniculata* and *Io*, for though it is certainly variable no variety seems to approximate at all to either of those species further than that of all these species there seem to be rare varieties of the female in which the entire insect is testaceous, and these undoubtedly are difficult to distinguish. In *fact*, however, I have not seen an example of *Io* devoid of markings, and the invariably traceable elytral striæ of *Atalanta* furnish a reliable (though not very conspicuous) distinction from *geniculata*.

A fully marked specimen of this insect has 4 ill-defined fuscous blotches placed transversely across its prothorax, a small well defined blackish blotch near the base of the 5th interstice of the elytra, a blotch (similar to the subbasal one) at the beginning of



less fuscous, and in some the whole surface of the elytra is dark brown with the markings still darker.

It is to be observed that, judged by the very insufficient description, *P. notata*, Oliv., is just possibly a variety of this species, but this is a mere guess, as the description does not indicate that the species belongs to the present subgroup, and the markings as described, though perhaps suggesting this species, are not identical with those of any example I have seen.

N.S. Wales and Victoria.

P. INTERSTITIALIS, Chp.

This species is very close to *P. Atalanta* in nearly all respects apart from its markings. There is, however, a slight but constant difference in the puncturation of the interstices of the elytra, for in the present species the interstices are so minutely punctured (disregarding the large punctures similiar to the seriate ones) as to present the appearance of bearing only one kind of puncture, viz., the larger ones, whereas in *Atalanta* the interstices have a distinct (though quite fine) close puncturation which, especially near the suture, gives a confused appearance even to a casual glance. This difference, however, is less evident in the males than the females. The colouring of the elytra is very different in these two species and, though both are variable, the varieties do not tend to resemblance to the other of the two. Of *Atalanta*, though I have seen and collected many specimens, I have not seen one in which there are not at least distinct traces of dark markings on the posterior declivity of the elytra, or in which there is in the front part of the elytra any marking unless a small well defined blackish spot on the 5th interstice close to its base, while in *interstitialis* the elytra are either devoid of markings altogether, or have a large ill-defined cloudy patch, somewhat darker than the general surface, a little behind the base and extending from near the suture to near the lateral margin. In some examples of both species the punctures on the elytra appear infuscate from some points of view.

N.S. Wales and Victoria.

NOTES ON SOME PORT JACKSON PLANTS.

By J. H. Maiden and J. H. Camfield.

Sprengelia incarnata, Sm., brevistylis var. nov.

Following is a description of a well marked variety of *S. incarnata*. Its chief differences from the normal species lie in the narrower petals which are quite free and consequently soon drop off, the shorter style which does not protrude beyond the anthers, and the rather narrower ovarium.

Sydney district, viz :—Manly (1894) and Rose Bay (June, 1898), *J. H. Camfield.*

It may be desirable to describe the inflorescence and fruit in some detail.

Inflorescence not symmetrical, but rather scattered; the flowers generally borne in obtuse clusters towards and at the ends of the branchlets, but sometimes singly. Flowers pale, almost whitish, not much spreading, giving the impression of a half-expanded flower. Sepals about 2½ lines long, very rigid, white, faintly tinged with pink, acutely acuminate, persistent. Petals barely as long as the sepals, soon fading, and falling from the flowers when detached from the plant. Stamens with flattish filaments which in

from that of the normal species. It is obtuse, so that it is somewhat difficult to select the highest flower in the cluster, but this is an easy matter in *S. incarnata*. When fully expanded the flowers of the latter, *i.e.*, sepals and petals, are nearly at right angles to the axis of the flower; in our variety they spread only to an angle of about 30° to the axis. But the chief point of difference consists, as already indicated, in the shortness of the style (to which we have drawn attention in the name of our variety) and the fact that it is always completely hidden by the anthers. The style is generally produced beyond the anthers in *S. incarnata* for ½ line. The anthers of the variety are also very short.

We have been giving attention to some of the New South Wales Banksias, particularly those which are found in the Port Jackson district (the original collecting ground for most of the east coast species), and desire to offer some notes in regard to two of them.

BANKSIA LATIFOLIA, R.Br., was originally described in *Trans. Linn. Soc.* x. 208. In *Prod.* 394 are Brown's own words, as follows:—"Foliis obovato-oblongis spinuloso-serratis basi acutis: subtus costatis reticulatis cinereo-tomentosis, perianthii unguibus sericeis; laminis glabris, caule fruticoso." Nothing is here said in regard to the size, varation in outline, &c., of the leaves.

In the figure in *Bot. Mag.* t. 2406 and in Bentham's description (*B.Fl.* v. 555) and all others we have observed, the plant is figured or described as with leaves "obovate-oblong, often truncate, irregularly serrate with short usually prickly teeth, contracted at the base, 4 to 8 inches long, 1½ to 3 inches broad."

We desire to invite attention to the fact that the species is more variable than it is usually supposed to be, some forms, not specifically different, having been confused (quite reasonably) with *B. integrifolia* and even *B. marginata*. The confusion between *B. paludosa* and this variety will also be alluded to. We think that the great amount of variation in forms indubitably included under *B. latifolia* should be indicated in a name, and suggest the

name var. *minor* for its small-leaved forms. At the same time, we have every gradation between the variety and the normal form.

We would point out that var. *minor* never grows in swamps, just as typical *latifolia* never grows on dry ridges, where its var. *minor* abounds. It may therefore be that the difference of environment may be largely responsible for the differences between the normal species and its variety.

The variety *minor* is usually between 3 and 4 feet in height and less frequently it is up to 6 or 7 feet, but exceptionally up to 12 feet in height.

As regards the leaves of the variety, we have them as small as 2 inches long by half an inch broad (and incidentally it may be mentioned that the leaves of *B. latifolia* are up to 10 inches and more long). The small-leaved forms are as a rule more entire (sometimes they are as entire as *B. integrifolia* usually is and this assists in the confusion of this species with the variety now under discussion). Another character, also not an absolutely constant one, but often a useful guide, is that the under surface of the midrib of B. *latifolia* var. *minor* is very often clothed with a dense covering of reddish-brown hairs.

The fruits and seed, together with the sucker-growth, prove that our variety is entirely distinct from *B. integrifolia*.

To a less extent the same is true in regard to *B. marginata*. Its dissepiments and seeds are distinctly different from those of

vein prominent, the smaller veins very plainly reticulate, the interspaces only slightly white tomentose.

Spikes cylindrical, usually from 2 to 4 inches long and 1½ inches wide between the stigmatic tips, very distinctly rufous, which appearance is especially marked before the splitting of the corollas.

Styles not more than 8 lines long and inserted strictly at right angles to the axis of the spike, quite straight and needle-like, except sometimes the stigmatic end, which is slightly bent; the base away from the rather contracted point of insertion, very slightly flattened; the stigmatic end scarcely thickened.

The segments of the corolla-tube very obtuse, with very short, shining, and closely appressed hairs from base to summit.

The whorled arrangement of its leaves and their similarity in shape to *B. integrifolia* place it near to that species. In the latter, however, the young branches are densely tomentose, while the secondary veins of the leaves are almost transverse and comparatively straight. In *B. paludosa* the young branches are almost glabrous, and the secondary veins of the leaves are much more oblique with apparently a greater tendency to curve upwards. But the principal differences are in the flowers. In *B. integrifolia* the styles in the fully developed inflorescence stand away very prominently from the split segments of the corolla-

In *B. paludosa* this feature is very much less present, and often entirely wanting; when the segments split both they and the styles appear to be of the same length.

The only other Port Jackson species closely related to it is *B. marginata*, but here again the differences are very pronounced. Its young branches are very villous. The secondary veins of the leaves, if looked at carefully in a strong light, will be seen to be straight, fine, and quite parallel, while their teeth are also longer, more slender, and sharper than in *B. paludosa*. Their shape also is decidedly oblong.

The styles also of *B. marginata* are very much longer, and as in the case of *B. integrifolia*, stand away from the split corolla-segments a long distance, nor are they straight, but decidedly bent. The tips of the corolla-segments are also almost acuminate.

The only description of the cones of *B. paludosa* we can find is by Meisner, in DC. *Prod.* xiv. 457 :—"Folliculi valde compressi, circ. semipollicares, lanâ rufâ hirsuti, margine glabrescentes."

But we are of opinion that the cones thus described are probably those of our var. *minor* of *B. latifolia;* they certainly do not apply to *B. paludosa.*

In reality the cones of *B. paludosa* are not very dissimilar to those of *B. integrifolia*, and alone furnish a strong argument for the close affinity of the two species. In *B. integrifolia* the fruitlets dehisce at an early stage; in *B. paludosa* the reverse is the case, according to our observations. At present we are inclined to attach some practical importance to this in the discrimination of cones obviously so closely allied.

We have been exercised in deciding for ourselves whether *B. paludosa* is a true species or only a variety of *B. integrifolia*, but it is worthy of note that there is what may be termed the *paludosa* type, having varieties of its own, readily distinguishable from *B. integrifolia*, which is in reality one of the most distinct species of the genus. *B. integrifolia* has been considered far more protean than it really is by having other species constantly confused with it, and it is one of the objects of this paper to

elucidate two of the plants which have been so confused. Mere size of a plant of course counts but little, at the same time it may be pointed out that *B. integrifolia* is a tree of 30 or 40 feet high, while *B. paludosa* is a stunted bush of scarcely 3 feet.

Returning to *B. paludosa*, we observe variation in the size of the leaves, which are much smaller in one form and more woolly-tomentose beneath; the reticulation is not quite so apparent as in the form figured in *Bot. Reg.* t. 697. The flower-spike of this form is also from 2 to 3 inches long, and under an inch broad, in place of the form figured in *Bot. Reg.* which is $4\frac{1}{4}$ inches long and nearly $1\frac{1}{2}$ broad.

In another form we have the flower-spike of about the same length as that figured in *Bot. Reg.* t. 697, but only $\frac{7}{8}$ inch wide. In other respects these forms show remarkable similarity.

In fine, we are of opinion that *B. paludosa* is a good species, and we therefore recommend that Brown's name be restored.

Lucina (Codakia) ambigua, n.sp.

Shell elongately orbicular, equivalve, inequilateral, tumid, solid, brownish-white, smooth towards the umbones; encircled by close-set, subgranular rather flattened ridges becoming broader and closer towards the base, lunale small, triangular; umbones tumid; beaks small, pointed, incurved; interior of the valves dark purple here and there in blotches, edges smooth. Long. 25, alt. 25; lat. 14 mm.

Hab.—San Remo, Victoria *(A. F. Kenyon)*.

This is a solid, dirty white, tumid species, very regularly concentrically sculptured with subgranular rather flattened ridges, differing from any other species known.

Tellina (Strigilla) Rudolphi, n.sp.

Shell subovate, rather convex, inequilateral, light yellow, thinnish, surface of the valves finely divaricately sculptured; posterior

Mr. D. G. Stead exhibited a beautiful preparation of a gastropod (*Hydatina physis*, Linn.) and its spiral ribbons of eggs, found in a rock-pool at Manly in January last. Molluscan ova are often to be met with, but unfortunately in very many cases without any satisfactory clue to the species to which they belong. In the present instance the animal was obtained in the act of oviposition. The ova much resemble those of an Aplysia figured by Rang.

Mr. Fletcher exhibited for Mr. J. H. Rose, of Warialda, a specimen of the handsome longicorn, *Rhytiphora rosei*, Olliff, from near Warialda, N.S.W., but few specimens of which have as yet been met with. Also a specimen of a little known frog, also from near Warialda, presenting slight colour differences from, but apparently correctly referable to, *Chiroleptes brevipes*, Peters, hitherto only known from the type specimen from Queensland. It appears to be a burrower, of exceedingly retiring habits, the very few specimens so far seen having been found in long grass

THURSDAY, AUGUST 31ST, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, August 31st, 1898.

E. G. W. Palmer, Esqr., in the Chair.

DONATIONS.

Department of Mines and Agriculture, Sydney—Agricultural Gazette of New South Wales. Vol. ix. Parts 7-8 (July-August, 1898). *From the Hon. the Minister for Mines and Agriculture.*

Department of Lands, Sydney—Report on Agriculture and Forestry for the year 1897; Report on Forest Branch for half-year ending December 31st, 1897, with Schedule xcix. *From the Hon. the Minister for Lands.*

Societas Zoologica Tokyonensis—Annotationes Zoologicæ. Vol. ii. Pars ii. (1898). *From the Society.*

Public Library of New South Wales—Report of the Trustees for 1897. *From the Trustees.*

Zoologischer Anzeiger. xxi. Band. Nos. 562-564 (Juni-Juli, 1898). *From the Editor.*

Conchological Society of Great Britain and Ireland—Journal of Conchology. Vol. ix. No. 3 (July, 1898). *From the Society.*

Senckenbergische Naturforschende Gesellschaft, Frankfurt a. M.—Abhandlungen. xviii. Band. iv. Heft (1895); xxiv. Bd. ii. Heft (1898): Katalog der Reptilien-Sammlung. Teil ii. (Schlangen) [1898]. *From the Society.*

Office of the Superintendent of Government Printing, Calcutta —Report of the Natural History Results of the Pamir Boundary Commission (Calcutta, fscap., 1898). By A. W. Alcock, M.B. *From the Superintendent of Government Printing.*

Indian Museum, Calcutta—Materials for a Carcinological Fauna of India. No. 3. Part i. (1898). By A. Alcock, M.B., C.M.Z.S. *From the Superintendent.*

Société d'Horticulture du Doubs, Besançon les Bains—Bulletin. Série Illustrée. No. 30 (Juin, 1898). *From the Society.*

Royal Society of London—Proceedings. Vol. lxiii. Nos. 398-399 (June-July, 1898). *From the Society.*

Zoological Society of London—Abstract, 21st June, 1898. *From the Society.*

Canadian Institute, Toronto—Proceedings. (New Series). Vol. i. Parts 4 and 5 (May, 1898): Transactions. Supplement to No. 9. Vol. v. Part 1 (1898). *From the Institute.*

American Geographical Society, N.Y.—Bulletin. Vol. xxx. No. 3, 1898. *From the Society.*

American Museum of Natural History, N.Y.—Bulletin. Vol. x. Article xiii. (pp. 235-248: June, 1898). *From the Museum.*

Pamphlet—On some Australian Insects of the Family Psyllidæ.

Johns Hopkins University, Baltimore—University Circulars. Vol. xvii. No. 136 (July, 1898): Hospital Bulletin. Vol. ix. No. 87 (June, 1898). *From the University.*

Royal Society of Edinburgh—Proceedings. Vol. xxi. (Sessions 1895-96, 1896-97): Transactions. Vol. xxxviii. Parts iii.-iv. (Session 1895-96): Vol. xxxix. Part i. (Session 1896-97). *From the Society.*

Royal Society of South Australia—Transactions. Vol. xxii. Part 1 (August, 1898). *From the Society.*

University of Melbourne—Calendar for the Year 1899. *From the University.*

Entomological Society of London—Transactions. 1898. Part ii. (June). *From the Society.*

Royal Irish Academy, Dublin—Proceedings. Third Series. Vol. iv. No. 5 (May, 1898): List of Members (May, 1898). *From the Academy.*

Académie Impériale des Sciences de St. Pétersbourg—Bulletin. v^e^. Série. Tome vii. No. 2 (Sept., 1897). *From the Academy.*

Perak Government Gazette. Vol. xi. Nos. 17-20 (June-July, 1898). *From the Government Secretary.*

Three Botanical Pamphlets (from the Queensland Agricultural Journal. Vols. ii. and iii.): Botany Bulletin. Nos. xiv.-xv. (October, 1896, and June, 1898). By F. M. Bailey, F.L.S., Colonial Botanist. *From the Author.*

Royal Geographical Society of Australasia, Victorian Branch—Transactions. Vol. xv. (1897). *From the Society.*

Société des Naturalistes de la Nouvelle-Russie, Odessa—Mémoires. Tome xxi. Liv. ii. (1897): T. xxii. Liv. i. (1898): Section Mathématique. T. xviii. (1897). *From the Society.*

The Surveyor, Sydney. Vol. xi. No. 8 (August, 1898). *From the Editor.*

Museo di Zoologia ed Anatomia Comparata della R. Università di Torino—Bollettino. Vol. xiii. Nos. 311-319 (Jan.-June, 1898) *From the Director.*

Koninklijk Zoologisch Genootschap, Amsterdam—"Natura Artis Magistra." 1838-1898. *From the Society.*

Faculté des Sciences de Marseille—Annales. Tome viii. Fascicules v.-x. (1898). *From the Faculty.*

Department of Mines, Melbourne—Progress Report of the Geological Survey of Victoria. No. ix. (1898). *From the Hon. the Minister for Mines.*

Royal Gardens, Kew—Bulletin of Miscellaneous Information. Nos. 64, 70-71, 80-81, 95, 106, 115-127, 130-131, 135: Appendix 1892, No. iii.; 1893, Nos. i.-iii.; 1894, No. i.; 1895, No. iii.; 1896, Nos. i.-ii.; 1897, No. ii. *From T. Steel, Esq., F.C.S., F.L.S.*

Royal Society of New South Wales—Abstract of Proceedings. August 3, 1898. *From the Society.*

NEW GENERA AND SPECIES OF FISHES.

By J. Douglas Ogilby.

SILURIDÆ.

Arius proximus, sp.nov.

D. i 7, 0. A. 16.

Depth of body 4, length of head 3 in the total length; width of head $\frac{3}{4}$ of its length, the upper profile undulating and moderately oblique. Eye with free lid, its diameter 6 in the length of the head and $2\frac{1}{3}$ in that of the snout, which is rounded and $1\frac{2}{3}$ times as wide as long. Interorbital region gently rounded, its width considerably more than that of the mouth and $1\frac{6}{9}$ in the length of the head. Premaxillary teeth in a continuous band, which is deeply emarginate behind, obliquely truncated at the extremities

vomerine patch. Maxillary barbel $\frac{2}{5}$ longer than the head, extending almost to the end of the pectoral spine. Postmental barbel $\frac{4}{5}$ of the maxillary, inserted but little behind and well outside the mental, which reaches far beyond the gill-opening. Cranial shield with a few coarse granules irregularly scattered over the median posterior region. Nuchal shield strongly keeled, finely granular, the granules forming divergent series posteriorly, its greatest width $\frac{4}{7}$ of its length, which is $\frac{2}{7}$ of its distance from the tip of the snout; outer border nearly linear, the posterior deeply forked. Dorsal plate moderate, subcruciform, feebly granular, its mesial length $3\frac{1}{2}$ in that of the nuchal shield. Fontanelle long and narrow, conspicuous; occipital groove strongly developed, extending backwards to the nuchal shield. Opercle smooth. Lateral line without anterior granules. Humeral process smooth, terminating in a blunt point, and extending along the proximal $\frac{1}{3}$ of the pectoral spine. Gill-membranes forming together a deep emargination, the free flap narrow; gill-rakers 4 + 12, the longest $\frac{2}{3}$ of the diameter of the eye. Axillary pore minute. Distance of

caudal round the tip of the tail; ventrals rounded, with 10 to 16 rays, inserted below or a little behind the origin of the second dorsal; pectoral rounded, with a pungent spine and 12 to 15 soft rays; caudal rounded.

Etymology:—*ἔνδον*, inside; *ῥίς*, nostril.

Type:—*Copidoglanis longifilis*, Macleay.

Distribution:—North coast of Australia.

LEPTOCEPHALIDÆ.

Under the name *Congermuræna*, Kaup, or *Congromuræna*, as amended by Günther, a large number of small congriform eels have been described by various authors. After a careful study of most of the descriptions I have arrived at the conclusion that these forms are clearly divisible into three groups, each of which should be known by a distinct generic name. The following brief diagnosis will suffice to show the characters which are relied on to separate the proposed genera:—

Differs from the two preceding species in the much larger head and at the same time much slighter projection of the upper jaw beyond the lower. It is more closely allied to *C. longicauda* than to *C. habenata*.

4. CONGERMURÆNA HETEROGNATHA.

= *Myrophis heterognathus*, Bleeker, Act. Soc. Sc. Néerl. Ind. v. p. 9, pl. iii. f. 1.

Hab.—Japan.

5. CONGERMURÆNA NEOGUINAICA.

= *Conger neoguinaicus*, Bleeker, Act. Soc. Sc. Néerl. Ind. vi. p. 22.

Hab.—Dorey, New Guinea.

Dr. Günther's suggestion that this species "may be identical with *C. habenata*" cannot be accepted if Bleeker is correct in describing the jaws as of equal length, the snout as $4\frac{1}{2}$ in the length of the head, and the vomerine teeth as biserial and "bluntly conical"; indeed, in view of the latter character, I am not fully satisfied that the species properly belongs to the present group.

CONGRELLUS, gen.nov.

Ariosoma, part., Swainson, Classif. Fish. i. p. 220, 1838, atypic.

Ophisoma, part., Swainson, l.c. ii. p. 334, 1839, (*obtusa*).

Congromuræna, part., Günther, Catal. Fish. viii., p. 40, 1870 (*balearica*); amended orthography.

Teeth acicular, those of the upper jaw not extending conspicuously forward beyond the mandible; vomerine band well developed. Head small, much shorter than the trunk. Cleft of mouth extending to below the middle of the eye or not so far. Eyes large. Dorsal originating above or nearly above the base of the pectorals, which are well developed. Vent usually but little in advance of the middle of the length. (A little conger; diminutive of *Congrus*, a related genus, = *Leptocephalus*).

Type:—*Muræna balearica*, De la Roche.

Distribution:—Tropical and subtropical parts of the Atlanti[illegible]cific Oceans; Mediterranean.

work the genus *Ophisomus* and the subfamily *Ophisominæ* have been applied to certain blennioid fishes. Indeed it appears probable that the application of the name *Ophisoma*, as a substitute for *Ariosoma*, to these eels was due to some confusion in their author's mind between his genera *Ophisomus* (= *Pholis*) and *Ariosoma*, and was not of deliberate intention.

The following species are referable to the genus *Congrellus* as here restricted :—

1. CONGRELLUS BALEARICUS.

= *Murœna balearica*, De la Roche, Ann. Mus. xiii. 1809, p. 327, f. iii.

Hab.—Mediterranean.

1*a*. CONGRELLUS OPISTHOPHTHALMUS.

= *Conger opisthophthalmus*, Ranzani, De Nov. Spec. Pisc. Disser. Prim. 16, pl. v. f. 1, 1838.

Hab.—Western Tropical Atlantic.

1*b*. CONGRELLUS MELLISSII.

the conclusions which these several distinguished authors have come to or acquiesced in as to the identity of the Atlantic and Pacific types, since by comparing the description of Dr. Gilbert with my specimen of *balearicus*, we find that in the latter, in addition to the differences noted by Gilbert, the head is comparatively much larger, the gill-slit much longer, and the pectoral fin shorter.

In none of these latter papers, however, is the Indo-Malayan *C. anago* mentioned, and if Dr. Gilbert's suggestion as to the identity of that species with *balearicus* is correct, it follows that the latter has not only an extraordinarily wide range, but also that it is very variable in its characters. In my opinion, however, *anago* is a distinct species which should possibly be kept apart from *anagoides*, while the differences pointed out by Gilbert between the Atlantic and Pacific short-tailed forms, in addition to those which I have referred to above, are sufficient to warrant their separation, and the latter, not having as yet received a distinctive title, might be known henceforth by the name of its

7. CONGRELLUS GUTTULATUS.

= *Congromuræna guttulata*, Günther, Voy. Challenger, Zool. xxii. p. 252, 1887.

Hab.—Fiji, in 315 fathoms.

It is much to be regretted that Dr. Günther's descriptions of these two species are so inadequate as to leave us in some doubt as to their true position. *Anguilla myriaster*, Brevoort, placed by Günther under *Congromuræna* does not appear to belong to that group.

BATHYCONGRUS, gen.nov.

Teeth acicular, those of the upper jaw extending forwards beyond the mandible; vomerine teeth more or less developed. Head large, subequal to the trunk. Cleft of mouth extending to behind the middle of the eye. Eyes small. Dorsal originating above or nearly above the base of the pectorals, which are usually short. Vent far in advance of the middle of the length. (*Βαθύς*,

With the exception of the short description in the British Museum Catalogue (viii. p. 43) I have had no opportunity of determining the position of this species, but I believe it will be found to enter this genus.

XIPHIDIIDÆ.

Eucentronotus, gen.nov.

Body anguilliform, strongly compressed. Scales minute, deeply embedded, non-imbricate present on the tail only. Lateral line short, consisting of a few tubes on the humeral region. Head moderate, wider than deep, the cheeks swollen; snout short and rounded. Mouth anterior, with rather wide, oblique cleft, the lower jaw projecting; lips thick and plicated, the fold interrupted below. Premaxillaries not protractile, the skin continuous with that of the snout; distal portion of maxillary exposed and strongly dilated, reaching to below the eyes. Jaws with stout conical teeth, in two series anteriorly, one laterally; vomer with

vomer toothless. Gill-rakers 0+9, the longest about $\frac{1}{3}$ of the diameter of the eye. Dorsal fin originating on the under side of the snout immediately above the anterior nostril; front rays not produced, much shorter than those of the posterior half of the fin, which are $\frac{5}{9}$ of the length of the head: preanal spines two, strong and compressed: ventrals with six rays, the left $2\frac{1}{3}$ to $2\frac{1}{2}$ times as long as the right, the fifth ray the longest, reaching to the third or fourth anal ray, and $2\frac{1}{3}$ to $2\frac{1}{2}$ in the head: left pectoral with nine rays, the two upper, in the male, slightly produced, its length, without the filament, $1\frac{3}{5}$ to $1\frac{3}{4}$ in the head; right pectoral as long as but narrower than the left, with eight rays: caudal cuneiform, $\frac{1}{5}$ of the total length: vertical fins in contact with the base of the caudal, with simple, naked rays. Scales cycloid, finely and concentrically striated. Curved portion of the lateral line more than twice as long as high, its length $5\frac{1}{3}$ in the straight portion. Sandy gray, with numerous small, faint, darker ocelli; a narrow yellowish band, parallel with the dorsal

apparently not found out at sea. The description is taken from eight specimens captured by the seine near the mouth of George's River, in July; they measured from 225 to 320 millimeters, and were in excellent condition for the table. None of them showed any symptoms of spawning except the largest, and this was fully distended with ova, which would have been shed at an early date. Numerous young flounders, from 50 to 100 millimeters in length, were brought ashore by the net at the same time, but were carefully returned by the fishermen to their native element.

Australian writers have confounded this species with *Pseudorhombus multimaculatus*, Günther, from which, however, it differs in having larger scales, a constantly shallower body and shorter head, a projecting upper jaw, longer and almost naked maxillary, cuneiform caudal, and very short, stout, blunt gill-rakers. With the two other Australian species, *Paralichthys arsius* and *P. muelleri*, it cannot possibly be confounded.

ON THE ECHINODERM FAUNA OF NEW ZEALAND.

By H. Farquhar.

(Communicated by the Secretary.)

The Echinoderm fauna of New Zealand is not homogeneous, nevertheless it contains a large number of peculiar forms which give it a strongly distinctive character of its own. Its affinities are strongest with that of Australia. Omitting doubtful and deep-water forms we find that fifty-eight per cent. of the known species are endemic, thirty-six per cent. occur in Australia, and only six per cent. have been found elsewhere and not in Australia.

If now we consider the several classes separately we find that remarkably great and exceedingly interesting differences obtain in their characteristics and distribution. Only two Crinoids have

which (*Asthenosoma gracile* and *Pourtalesia laguncula*) range beyond the New Zealand seas. Of the rest fourteen are known to occur also in Australia, some of which are widely ranging forms. Two species (*Echinus magellanicus* and *Echinus margaritaceus*), which are widely diffused in the Southern Ocean and western Pacific, appear to be absent from the Australian fauna, though we might expect to find them there. *Evechinus chloroticus*, the commonest New Zealand Echinoid, ranges northwards to Fiji, and this or a nearly allied form (*E. australe*) occurs in Australia. The occurrence of *Laganum rostratum*, a Zanzibar form, in New Zealand appears to be extremely doubtful, and our species may be *Laganum decagonale*, which has a wide range in the western Pacific and Indian Ocean, and occurs freely in north-eastern Australia. I suspect that our species of *Salmacis*, identified as *S. globator*, may prove to be *S. alexandria*, Bell ("Alert" Rpt. p. 118, and Proc. Linn. Soc. N.S.W. Vol. ix. p. 505), which is a common Australian form. Of the twenty-three above-

Zealand was almost as strong with that of Australia in early Tertiary times as at the present day (New Zealand Geological Report for 1892-1893 [1894]. p. 127).

Of Holothurians we have twenty species, omitting *Psolus macquariensis*, Dendy; for it will probably be found that the marine fauna of the Macquarie Islands is not New Zealandian, but Antarctic. Six of these were obtained from deep water by the "Challenger." The rest (fourteen species) appear to be endemic.

Thus we see that nearly all the Ophiuroids and most of the Asteroids are endemic, while all the Echinoids, except perhaps *Goniocidaris umbraculum*, occur elsewhere, a large number of them being widely ranging forms. The littoral Holothurians, on the other hand, are all peculiar to New Zealand. When we consider the immense effect of currents in the diffusion of marine animals, it appears that the eggs or plutei of most Echinoids remain free for a considerable time, and are capable of being transported long distances without being destroyed, so that the littoral species are usually widely diffused. Some of the Asteroids in their young state apparently remain free for a considerable time, and are widely dispersed by marine currents; many species, however, cannot be conveyed across wide stretches of ocean, and are confined to very limited areas of distribution. Very few Ophiuroids are capable of being transported across wide oceans, being either but a short time free or incapable in their young stage of enduring changes of temperature, and being tossed about for some time on the surface of the sea. No doubt many of them are viviparous, and are thus confined to very limited areas, as is the case with *Ophiopeza cylindrica*. Even viviparous species, however, which live on seaweed may become widely dispersed by being transported on masses of floating seaweed. This is probably the case with *Ophiomyxa australis*, which is viviparous. The eggs or young of the littoral Holothurians only remain a short time free or are too delicate and easily destroyed to be transported long distances on the surface of the sea.

Since the systematic study of the distribution of marine animals was taken in hand by the late Prof. Edward Forbes, it has been evident that the faunal regions based on the distribution of terrestrial animals do not correspond with the marine faunal regions. Prof. Allman has defined a number of regions to illustrate the distribution of the Hydroida ("Challenger" Rpt. Vol. xxii. p. lv.). The Australian Region is described as that area lying between the 20th and 60th parallels of south latitude and between the meridians of 90 degrees east and 170 degrees west longitude and the East Indian Region, the area lying immediately to the north of the Australian Region, between the same meridians and extending northwards to the 30th degree of north latitude. In considering the distribution, not only of the Hydroids or Echinoderms, but of the marine fauna as a whole, it seems to me necessary in order to obtain a more natural division that the boundary between these two regions should be moved considerably further south—say, to latitude 25° S., extending from the western boundary of the region to the east coast of Australia, and thence curving southwards so as to exclude Norfolk Island and the Kermadecs from the Australian Region, the marine fauna of these islands being rather Polynesian or tropical in character than New

Lord Howe Island, forms a distinct and well-marked subregion. I exclude Lord Howe Island, for although it is part of the New Zealand area (situated on the New Zealand Plateau) and the affinities of its terrestrial fauna and flora are strongly New Zealandian, its marine fauna is largely, if not wholly, Australian.

Our knowledge of the Echinoderm fauna of New Zealand is far from complete. Very little systematic collecting has been done, and the dredge has hardly been used at all. No doubt many new and interesting forms still remain to be discovered, and when our valuable off-shore fisheries are developed and the littoral zone becomes thoroughly explored the richness of the fauna will be largely increased. We have here in New Zealand all the conditions favourable to the development and subsistence of a rich and varied littoral marine fauna—genial climate, a broad belt of littoral fringing the land, great extent of coast line with many sheltered bays and harbours, numerous shell-banks and rocky reefs clothed with rich and varied marine vegetation, and great diversity of habitat caused by the variety of the geological structure of the land. And what appears to me to add immensely to the interest attaching to our fauna, and makes its elucidation so exceedingly important, is that we have here in New Zealand a set of physical conditions which do not obtain elsewhere—namely, a group of islands which are neither oceanic nor continental, but rather intermediate in character, rising from a great submerged plateau, which has been the scene of immense changes during Tertiary times, and is separated from all the great continental areas by deep and wide oceans.

List of New Zealand Echinoderms.

CRINOIDEÆ.

COMATULÆ.

1. Antedon alternata.

A. alternata, Carpenter, 1888, "Challenger" Rept., Vol. xxvi., p. 179.

Distribution.—Off East Cape; Kermadec Isds.; New Guinea; Japan; 630-1070 fms.

2. EUDIOCRINUS SEMPERI.

E. Semperi, Carpenter, 1882, Journ. Linn. Soc. (Zool.), Vol. xvi., p. 497; 1888, "Challenger" Rept., Vol. xxvi., p. 82.

Distribution.—Off East Cape; Australia; 700-950 fms.

OPHIUROIDEA.

OPHIURIDÆ.

3. PECTINURA MACULATA.

Ophiarachna maculata, Verrill, 1869, Proc. Bost. Soc. Nat. Hist., Vol. xii., p. 388, (Trans. N.Z. Inst., Vol. xii., p. 282); *Pectinura maculata*, Verrill, 1869, Amer. Journ. Sci., Vol. xlviii., 2nd Ser., p. 431; 1871, Trans. Connect Acad., Vol. i., p. 574; Lyman, 1874, Bull. Mus. Comp. Zool., Vol. iii., p. 222; 1882, "Challenger" Rpt., Vol. v., p. 15; Farquhar, 1897, Journ. Linn.

12. Amphiura parva.

A. parva, Hutton, 1878, Trans. N.Z. Inst., Vol. xi., p. 305.
Distribution.—Dunedin Harbour.

13. Amphiura lanceolata.

A. lanceolata, Lyman, 1879, Bull. Mus. Comp. Zool., Vol. vi., p. 25; 1882, "Challenger" Rpt., Vol. v., p. 133.
Distribution.—Off East Cape; 700 fms.

14. Amphiura rosea.

A. rosea, Farquhar, 1893, Trans. N.Z. Inst., Vol. xxvi., p. 110.
Distribution.—Wellington Harbour.

15. Amphiura pusilla.

A. pusilla, Farquhar, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 191.
Distribution.—Cook Strait.

18. OPHIOMYXA AUSTRALIS.

O. *australis*, Lütken, 1869, Addit. ad Hist. Oph., Part 3, p. 99; **Lyman**, 1882, "Challenger" Rpt., Vol. v., p. 246; Farquhar, 1895, **Trans.** N.Z. Inst., Vol. xxvii., p. 199.

Distribution.—Cook Strait; Stewart Island; off Cape Egmont; Australia; St. Paul's Rocks; South Africa; Amboyna; Tongatabu; Fiji; Philippine Isds.; 0-315 fms.

ASTEROIDEA.

ASTROPECTINIDÆ.

19. ASTROPECTEN EDWARDSII.

A. Edwardsii, Verrill, 1867, Trans. Connecticut Acad., Vol. i., p. 250 (Trans. N.Z. Inst., Vol. xii., p. 281); Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 734.

Distribution.—Auckland.

20. ASTROPECTEN POLYACANTHUS,

A. polyacanthus, Müller and Troschel, 1842, System der Aste den, p. 69; Perrier, 1875, Révis. Stell. Mus., p. 355 (Archiv. Zool. Expér., Vol. v., p. 275); Sladen, 1878, Journ. Linn. Soc. (Zool.), Vol. xiv., p. 428; 1889, "Challenger" Rpt., Vol. xxx. p. 201; Bell, 1884, "Alert" Rpt., p. 133; 1884, Proc. Linn. Soc. N.S.W., Vol. ix., p. 499; 1887, Trans. Roy. Dublin Soc. (Series 2), Vol. iii., p. 648; Loriol, 1885, Mém. Soc. Phys. Genève, Vol. xxix., p. 76; 1893, Revue Suisse Zool. et Ann. Mus. Genève, Vol. i., p. 379; *A. vappa*, Müller and Troschel, 1843, Wiegm. Archiv f. Naturgesch., p. 119; *A. hestrix*, Müller and Troschel, 1842, System der Asteriden, p. 70; *A. armatus*, Müller and Troschel, 1842, *ibid.* p. 71; Lütken, 1864, Vidensk. Meddelelser, p. 132; Martens, 1865, Ueb. Ostasiat. Echin., Wiegm. Archiv, p. 352; Hutton, 1872, Cat. Ech. N.Z., p. 6; Walter, Jen. Zeitsch., Vol. xviii., p. 368; Ives, 1891, Proc. Acad. Philad., Pt. 2, p. 211; *A. chinensis* and *A. ensifer*, Grube, 1865, Jahresber. Schles. Gesellsch. f. vaterl. Cultur, Breslau, p. 36.

Distribution.—New Zealand; Australia; Admiralty and Fiji Islands; Japan; China; Ceylon; Andaman Islands; B. of Bengal; Mauritius; Red Sea.

21. PSILASTER ACUMINATUS.

P. acuminatus, Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 225.

Distribution.—Off the west coast North Island; Australia; South Africa; 150-950 fms.

PENTAGONASTERIDÆ.

22. ASTROGONIUM PULCHELLUM.

Pentagonaster pulchellus, Gray, 1840, Ann. Mag. Nat. Hist., Vol. vi., p. 280; 1866, Synopsis of Starfish, p. 11; Hutton, 1872, Cat. Ech. N.Z. p. 8; *P. (Dorigona) pulchellus*, Tenison-Woods, 1879, Trans. Phil. Soc. Adelaide, p. 91; *Stephanaster elegans*, Ayres, 1854, Proc. Boston Soc. Nat. Hist., Vol. iv., p. 119; *Astrogonium crassimanum*, Möbius, 1859, Neue Seesterne Ham-

29. Asterina regularis.

Asterina gunnii var., Gray, 1840, Ann. Mag. Nat. Hist., Vol. vi, p. 290; *Asteriscus australis* (pars), Müller and Troschel, 1842, System der Asteriden, p. 43; *Asterina (Astericus) regularis*, Verrill, 1867, Trans. Conn. Acad., Vol. i., p. 250 (Trans. N.Z. Inst., Vol. xii., p. 281); *Asterina cabbalistica*, Lütken, 1871, Videnskab. Medd. naturh. Foren. i Kjobenhavn, p. 242; *Asterina regularis*, Hutton, 1872, Cat. Ech. N.Z., p. 9; 1878, Trans N.Z. Inst., Vol. xi., p. 306; Sladen, 1889, "Challenger" Rpt., Vol. xxx., pp. 392, 776; Farquhar, 1895, Trans. N.Z. Inst., Vol. xxvii., p. 199; 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 196.

Distribution.—New Zealand.

30. Asterina novæ-zealandiæ.

A. novæ-zealandiæ, Perrier, 1876, Archiv. Zool. Expér., Vol. v., p. 33; Sladen, 1898, "Challenger" Rpt., Vol. xxx., pp. 391, 774.

Distribution.—New Zealand.

37. STICHASTER INSIGNIS.

S. insignis, Farquhar, 1895, Trans. N.Z. Inst., Vol. xxvii., p. 203; 1898, Vol. xxx., p. 188.

Distribution.—Wellington Harbour; Taylor's Mistake.

ECHINASTERIDÆ.

38. CRIBRELLA COMPACTA.

Henricia occulata, Hutton, 1872, Cat. Ech. N.Z., p. 7; *Cribrella compacta*, Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 543; Farquhar, 1898, Trans. N.Z. Inst., Vol. xxx., p. 191.

Distribution.—Off the West coast North Island.

39. CRIBRELLA ORNATA.

Echinaster (Cribrella) ornata, Perrier, 1863, Ann. Sci. Nat., 5e Série, t. xii., p. 251; *Cribrella ornata*, Perrier, 1875, Révis. Stell. Mus p. 112 (Archiv. Zool. Expér., t. iv., p. 376); Sladen, 1889 "Challenger" Rpt., Vol. xxx., pp. 541, 543, 808;

Rpt., Vol. xxx., p. 810; Martens, 1889, Sitz. der Gesell. naturf. Berlin, p. 183.

Distribution.—New Zealand; Australia; Philippine Isds.; Timor; Madras; Mauritius; Zanzibar; Red Sea; New Guinea.

ASTERIIDÆ.

42. Asterias calamaria.

A. calamaria, Gray, 1840, Ann. Mag. Nat. Hist., Vol. vi., p. 179; 1866, Synopsis of Starfish, p. 1; Perrier, 1875, Révis. Stell. Mus., p. 43 (Archiv. Zool. Expér., t. iv.); Bell, 1881, Proc. Zool. Soc., p. 494; Studer, 1884, Verh. d. Akad. d. Wissensch. Berlin, p. 8; Bell, 1884, "Alert" Rpt., p. 123; 1884, Proc. Linn. Soc., N.S.W., Vol. ix, p. 498; Loriol, 1885, Mém. Soc. Phys. Genève, Vol. xxix., p. 4; Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 583; Etheridge, 1889, "Lord Howe Island," p. 38; Farquhar, 1895, Trans. N.Z. Inst., Vol. xxvii., p. 200; 1898, Vol. xxx., p. 187; *Asteracanthion calamaria*, Müller and Troschel, 1842, System der Asteriden, p. 19; Dujardin and Hupé, 1862, Suites à Buffon, Echin., p. 339; *Asteracanthion tenuispinus* and *A. calamaria*, Michelin, 1845, Magasin de Zoologie, p. 18; *Coscinasterias muricata*, Verrill, 1867, Trans. Conn. Acad., Vol. 1, p. 249 (Trans. N.Z. Inst., Vol. xii., p. 280); Hutton, 1872, Cat. Ech. N.Z., p. 6; *Asteracanthion australis*, Perrier, 1869, Ann. Sci. Nat. 5e Série, t. xii., p. 220; *Asterias jehennesi*, Perrier, 1875, Révis. Stell. Mus. p. 47 (Archiv. Zool. Expér., t. iv., p. 311).

Distribution.—New Zealand; Lord Howe Island; Australia; Tasmania; Mauritius; 0-38 fms.

43. Asterias scabra.

Margaraster (?) scaber, Hutton, 1872, Cat. Ech. N.Z., p. 5; *Asterias scabra*, Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 826; Farquhar, 1895, Trans. N.Z. Inst., Vol. xxvii., p. 202.

Distribution.—Wellington; Nelson; Akaroa.

44. Asterias mollis.

A. mollis, Hutton, 1872, Cat. Ech. N.Z., p. 4; Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 824.

Distribution.—Lyttelton.

45. Asterias fragilis.

A. fragilis, Studer, 1884, Anhang. z. d. Abhandl. d. k. preuss. Akad. d. Wiss. Berlin, vom Jahre 1884, p. 11.

Distribution.—Off the East Coast; 597 fms.

46. Uniophora granifera.

Asterias granifera, Lamarck, 1816, Hist. Nat. Anim. s. Vert. t. ii., p. 560; *Asteracanthion graniferus*, Müller and Troschel, 1842, System der Asteriden, p. 20; Hutton, 1878, Trans. N.Z. Inst., Vol. xi., p. 306; *Margaraster graniferus*, Gray, 1866, Synopsis of Starfish, p. 2; *Asterias granifera*, Perrier, 1878, Révis. Stell. Mus. p. 76; *Uniophora granifera*, Bell, 1881, Proc. Zool. Soc., p. 497; Sladen, 1889, "Challenger" Rpt., Vol. xxx., p. 830.

6, 44; Etheridge, 1889, "Lord Howe Island," p. 37; Farquhar, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 189.

Distribution.—New Zealand; Australia; Tasmania; Lord Howe Island; New Caledonia.

49. Asthenosoma gracile.

A. gracile, A. Agassiz, 1881, "Challenger" Rpt., Vol. iii., p. 89.

Distribution.—Off East Cape; Philippine Islands; New Guinea; 150-1400 fms.

50. Phormosoma rigidum.

P. rigidum, A. Agassiz, 1881, "Challenger" Rpt., Vol. iii., p. 104.

Distribution.—Off East Cape; 700 fms.

51. Strongylocentrotus tuberculatus.

Echinus tuberculatus, Lamarck, 1816, Anim. sans Vert., p. 50; *Strongylocentrotus tuberculatus*, A. Agassiz, 1872, Rev. Ech., pp. 165, 449; Tenison-Woods, 1878, Proc. Linn. Soc. N.S.W., Vol. ii., p. 157; Etheridge, 1889, "Lord Howe Island," p. 38; Bell, 1884, Proc. Linn. Soc. N.S.W., Vol. ix., p. 502; Ramsay, 1885, Cat. Ech. Aust. Mus., pp. 13, 46; Farquhar, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 189; *Echinus omalostoma*, Valenciennes, 1846, Voy. de "Venus," Zooph. Pl. 6, figs. 2-2f.

Distribution.—New Zealand; Lord Howe Island; Australia; Japan; China.

52. Strongylocentrotus erythrogrammus.

Echinus erythrogrammus, Valenciennes, 1846, Voy. de "Venus," Zooph. Pl 7, figs. 1-1d; *Strongylocentrotus erythrogrammus*, A. Agassiz, 1872, Rev. Ech., pp. 163, 441; Tenison-Woods, 1878, Proc. Linn. Soc. N.S.W., Vol. ii., p. 157; 1880, *ibid.*, Vol. v., p. 199; A. Agassiz, 1881, "Challenger" Rpt., Vol. iii., p. 106; Bell, 1884, Proc. Linn. Soc. N.S.W., Vol. ix., pp. 502, 505; 1884, "Alert" Rpt., p. 121; Ramsay, 1885, Cat. Ech. Aust. Mus., pp. 13, 46; Farquhar, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 189.

Distribution.—New Zealand: New Caledonia: Australia: Tasmania: Samoa: Japanese Seas: Chili.

53. Spherechinus australis.

S. australis, A. Agassiz, 1872, Bull. Mus. Comp. Zool., Vol. ii. Rev. Ech. pp. 150, 451; 1881, "Challenger" Rep., Vol. iii., p. 108; Tenison-Woods, 1878, Proc. Linn. Soc. N.S.W., Vol. i. p. 158; 1880, *ibid.*, Vol. v., p. 261; Ramsay, 1885, Cat. Rec. Aust. Mus., pp. 14, 46; Bell, 1884, Proc. Linn. Soc. N.S.W., Vol. ix., p. 502.

Distribution.—New Zealand; Australia; Tasmania; Mauritius; Solomon Islands.

ECHINIDÆ.

54. Temnopleurus Reynaudi.

T. Reynaudi, Agassiz, 1846, Cat. Rais. Ann. Sc. Nat., Vol. vi., p. 360; A. Agassiz, 1872, Rev. Ech., pp. 166, 451; 1881, "Challenger" Rep., Vol. iii., p. 107; Studer, 1878, Journ. Linn. Soc. (Zool.), Vol. xiv., p. 137.

Distribution.—West of New Zealand; Australia; Ceylon; China Seas; East Indies; Philippine Islands.

55. Salmacis globator.

S. globator, Agassiz, 1846, Cat. Rais. Ann. Sc. Nat., Vol. vi.,

60. Echinus magellanicus.

E. magellanicus, Phillipi, 1857, Wieg. Archiv, Vol. i., p. 130; A. Agassiz, 1872, Rev. Ech., pp. 123, 492; Hutton, 1876, Trans. N.Z. Inst., Vol. ix., p. 362; Tenison-Woods, 1878, Proc. Linn. Soc. N.S.W., Vol. ii., p. 165; Studer, 1889, Die Forschungsreise S.M.S. "Gazelle," Vol. iii., pp. 283. 285; Farquhar, 1895, Trans. N.Z. Inst., Vol. xxvii., p. 196; *Echinus albocinctus*, Hutton, 1872, Cat. Ech. N.Z., p. 12.

Distribution.—Wellington Harbour; Pelorus Sound; Tasman Bay; Dunedin; Stewart Island; Philippine Islands; Falkland Islands; Magellan Straits; Chili; Cape of Good Hope to Marion and Kerguelen Islands; Prince Edward Island.

61. Echinus margaritaceus.

E. margaritaceus, Lamarck, 1816, Anim. sans Vert., p. 47; Valenciennes, 1846, Voy. de "Venus," Zooph., Pl. 6, figs. 1-1f; A. Agassiz, 1872, Rev. Ech., pp. 124, 493; 1881, "Challenger" Rpt., Vol. iii., p. 117; Studer, 1889, Die Forschungsreise S.M.S. "Gazelle," Vol. iii., pp. 288, 289.

Distribution.—New Zealand; Magellan Straits; Kerguelen and Heard Islands; Juan Fernandez.

62. Evechinus chloroticus.

SPATANGIDÆ.

66. Pourtalesia laguncula.

P. laguncula, A. Agassiz, 1879, Proc. Am. Acad., Vol. xiv. p. 205; 1881, "Challenger" Rpt., Vol. iii., p. 137.

Distribution.—Off East Cape and Cape Egmont; East Indies; North Pacific; 700-2900 fms.

67. Echinocardium australe.

E. australe, Gray, 1851, Ann. Mag. Nat. Hist., Vol. vii., p. 131; 1855, Cat. Rec. Ech., p. 44; A. Agassiz, 1872, Rev. Ech., pp. 109, 580; 1881, "Challenger" Rpt., Vol. iii., p. 174; Sladen, 1878, Journ. Linn. Soc. (Zool.), Vol. xiv., p. 441; Hutton, 1878, Trans. N.Z. Inst., Vol. xi., p. 307; Tenison-Woods, 1878, Proc. Linn. Soc. N.S.W., Vol. ii., p. 174; 1888, *ibid.*, Vol. v., p. 204; Bell, 1884, *ibid.*, Vol. ix., p. 503; Ramsay, 1885, Cat. Ech. Aust. Mus., pp. 37, 53; Meissner, 1892, Sitz. der Gesell. naturf. Berlin, p. 185; Farquhar, 1895, Trans. N.Z. Inst., Vol. xxvii., p. 196; 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi. p. 187; *Echinocardium zealandicum*, Gray, 1851, Ann. Mag. Nat. Hist., Vol. vii., p. 131; 1855, Cat. Rec. Ech., p. 44; *Amphidotus zealandicus*, Hutton, 1872, Cat. Ech. N.Z., p. 14.

74. Caudina coriacea.

Molpadia coriacea, Hutton, 1872, Cat. Ech. N.Z., p. 17; 1879, Trans. N.Z. Inst., Vol. xi., p. 307; *Caudina meridionalis*, Bell, 1883, Proc. Zool. Soc., p. 58; *C. coriacea*, Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), pp. 47, 54; Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 28; l.c., p. 456.

Distribution.—Oamaru; New Brighton; Lyttelton; Cook Straits.

75. Trochostoma albicans, var. glabra.

T. albicans, var. *glabra*, Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), p. 46.

Distribution.—Off East Cape; 700 fms.

76. Trochostoma violacea.

Trochostoma violacea, Studer, 1877, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin; *T. violacea*, Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), p. 42.

Distribution.—Off East Cape; Kerguelen; 20-700 fms.

DENDROCHIROTÆ.

77. Cucumaria Huttoni.

Cucumaria Huttoni, Dendy, 1897, Journ. Linn. Soc. (Zool.),

enger" Rpt., Vol. xiv. (Hol.), p. 117; Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 34.

Distribution.—Stewart Island.

80. Colochirus alba.

Chirodota (?) alba, Hutton, 1872, Cat. Ech. N.Z., p. 17; *Echinocucumis alba*, Hutton, 1879, Trans. N.Z. Inst., Vol. xi., p. 307; Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), p. 111; *Colochirus alba*, Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 35.

Distribution.—Wellington Harbour.

81. Colochirus ocnoides.

Colochirus ocnoides, Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi, p. 36.

Distribution.—New Brighton.

82. Colochirus calcarea.

Colochirus calcarea, Dendy, 1897, Journ. Linn. Soc., (Zool.), Vol. xxvi., p. 38.

Distribution.—Cook Strait.

83. Colochirus brevidentis.

Thyone brevidentis, Hutton, 1872, Cat. Ech. N.Z., p. 16; Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), p. 141; *Colochirus brevidentis*, Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 40.

Distribution.—New Zealand.

84. Psolus macquariensis.

Psolus macquariensis, Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 41.

Distribution.—Macquarie Island.

85. Thyonidium longidentis.

Thyone longidentis, Hutton, 1872, Cat. Ech. N.Z., p. 16; *Thyone caudata*, Hutton, 1872, l.c. p. 16; *Pentadactyla longidentis*, Hutton, 1879, Trans. N.Z. Inst., Vol. xi., p. 307; *Thyonidium rugosum*, Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), p. 95; *Thyone longidentis*, Théel, 1886, l.c. p. 141; *Thyonidium caudatum*, Théel, 1886, l.c. p. 147; *Phyllophorus caudatus*, Ludwig, 1891, Bronn's Klassen und Ordnungen, Echinodermen, p. 347; *Phyllophorus rugosus*, Ludwig, 1891, l.c. p. 347; *Thyonidium longidentis*, Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 42.

Distribution.—Cook Strait.

ASPIDOCHIROTÆ.

86. Stichopus mollis.

Holothuria mollis, Hutton, 1872, Cat. Ech. N.Z., p. 15; 1879, Trans. N.Z. Inst., Vol. xi., p. 308; Théel, 1886, "Challenger" Rpt., Vol. xiv. (Hol.), p. 239; *Sticophus sordidus*, Théel, 1886, l.c. p. 167; *Stichopus mollis*, Dendy, 1897, Journ. Linn. Soc. (Zool.), Vol. xxvi., p. 46.

Distribution.—Cook Strait.

87. Holothuria Robsoni.

ELPIDIIDÆ.

89. ENYPNIASTES EXIMIA.

Enypniastes eximia, Théel, 1882, "Challenger" Rpt., iv. (Hol.), p. 56.

Distribution.—Off the east coast North Island; 1100 fms.

DEIMATIDÆ.

90. PANNYCHIA MOSELEYI.

Pannychia moseleyi, Théel, 1882, "Challenger" Rpt., Vol. iv. (Hol.), p. 88.

Distribution.—Off East Cape; Australia; 700-950 fms.

CONTRIBUTION TO A KNOWLEDGE OF THE ARACHNIDAN FAUNA OF BRITISH NEW GUINEA.

By W. J. Rainbow,

Entomologist to the Australian Museum, Sydney.

(Contribution from the Australian Museum.)

(Plate vii.)

Towards the close of last year Mr. C. de Vis, M.A., Curator of the Queensland Museum, kindly placed in my hands, for the purposes of determination, and in the event of new species, description, a collection of Papuan Arachnida obtained in British New Guinea by Mr. A. Giulianetti, under the direction of His Excellency Sir Wm MacGregor, M.D., K C.M.G. Unfortunately many of the specimens were so damaged that it was impossible to determine them, and consequently much material had to be rejected. The majority of the specimens obtained were forms already known to science, and these are all enumerated below.

Order ARACHNIDA.

Suborder ARANEÆ THERAPHOSÆ.

Family AVICULARIIDÆ.

Subfamily PACHYLOMEREÆ.

Genus CONOTHELE, Thor.

1. CONOTHELE MALAYANA, Dolesch.

Loc.—Neneba, Mount Scratchley, between 4,000 and 5,000 feet, July, 1896.

Subfamily BARYCHELINÆ.

Genus IDIOMMATA, Auss.

2. IDIOMMATA RETICULATA, L. Koch.—Only one specimen, and that immature, but there can be no doubt as to its identity, as it agrees so closely with Koch's figure and description.

Loc.—Mount Scratchley, at 12,200 feet.

3. IDIOMMATA CRASSIPES, sp.nov.

(Plate VII., fig. 1.)

♀. Cephalothorax 8·3 mm. long, 7·5 mm. wide; abdomen 11·2 mm. long, 7·5 mm. wide.

Cephalothorax yellow-brown, convex, clothed with short, strong, black hairs. *Caput* arched, truncated in front, where it is margined with a broad, pale flesh-coloured band. *Clypeus* broad, normal grooves distinct, junction of cephalic and thoracic segments indicated by a deep transverse indentation or cleft. *Marginal band* broad.

Eyes elevated on a prominent tubercle; those comprising the front row are large and separated from each other by a space equal to about twice their individual diameter; those of the second row are equal in size, but are separated from their anterior neighbours by about one and one-half their individual diameter, and from each other by a space equal to about one diameter; the third series of eyes are small, contiguous, arranged in two pairs

of which the lateral ones are sensibly the largest and are placed obliquely to the rear of those comprising the median row; the four large eyes are of a grey tint, and the four smaller ones of a pearl-grey lustre, and each of the latter is encircled with a black ring.

Legs strong, yellow-brown, with dark brown annulations, thickly clothed with coarse black hairs, and armed with long, strong spines; each tarsus is terminated with a scopula, has two claws, and each of the latter is armed with two teeth. Relative lengths of legs: 4, 1, 2, 3.

Palpi similar in colour and armature to legs; each palpus is terminated with a claw, and scopula.

Falces long, strong, projecting well forward, dark mahogany-brown, clothed at apices and inner margins with long, coarse, black hairs; the outer margin of the furrow of each falx is fringed with long, red hairs, and the inner margins are each armed with a row of four teeth. *Fangs* long, glossy black.

Maxillæ long, strong, divergent, glossy, yellow-brown, mode-

Eyes elevated on a prominent dark brown tubercle, and arranged in similar order to those of *I. crassipes;* the four large eyes are shining black and the four smaller ones of a pearl-grey lustre, and each is encircled with a black ring.

Legs strong, yellow-brown, clothed with grey hairs, and armed with short, strong, black spines; each tarsus is terminated with a scopula and two black claws, and each of the latter is armed with two teeth near its base.

Palpi long, strong, similar in colour and armature to legs.

Falces long, strong, projecting well forward, yellow-brown, clothed at apices and inner margins with long, coarse grey hairs.

Maxillæ divergent, yellow-brown, the upper surfaces clothed with moderately long black hairs, and the inner margins fringed with long tawny hairs.

Labium concolorous, broad, and clothed with moderately long, coarse black hairs.

Sternum concolorous also, oval, broadest towards posterior extremity and clothed with coarse black hairs.

Abdomen obovate, moderately projecting over base of cephalothorax, dark brown, almost black, clothed with short grey hairs.

Epigyne a simple transverse slit.

Loc.—Neneba.

Subfamily MASTERIÆ.

Genus ANTROCHARES, gen.nov.

Cephalothorax moderately arched, longer than broad, median depression round. *Caput* high, arched.

Eyes six, in two groups, the anterior row containing two, and the posterior four; the lateral eyes are large, oval, and oblique; median eyes small.

Maxillæ long, strong, divergent, inner margins slightly hollowed out towards centre.

Labium rather broader than long, convex; apex rounded off.

Legs long, thin; tarsi three-clawed, the two longest only serrated; scopula absent.

Palpi long, thin, terminal claw pectinated.

Mamillæ short.

5. ANTROCHARES MACGREGORI, sp.nov.

(Plate VII., figs. 2, 2*a*.)

♀. Cephalothorax 1·7 mm. long, 1·5 mm. broad; abdomen 2·5 mm. long, 1·4 mm. broad.

Cephalothorax convex, sparingly clothed with yellowish hairs. *Caput* strongly arched at the centre, obtusely truncated in front. *Clypeus* broad, convex, normal grooves and indentations distinct, median depression at junction of cephalic and thoracic segments deep and round. *Marginal band* broad.

Eyes six, seated on a somewhat quadrangular, tubercular eminence, and arranged in two groups of 2 and 4 respectively; the lateral eyes are large, oval, and oblique, and the median pair are small and round. The two front eyes are separated from each other by a space equal to their individual width, and are slightly hollowed towards the centre of their inner margins; the posterior pair are oval, diverge outwards, and are separated from each other at their greatest extremity by twice their individual length;

Abdomen ovate, moderately projecting over base of cephalothorax, yellowish-brown, densely clothed with long, coarse, yellowish hairs.

Epigyne a simple transverse slit.

Mamillæ cylindrical, in two pairs, and abbreviated; of these the second pair are somewhat the longest.

Loc.—Neneba, Nov., 1896.

This interesting species makes the third genus now known of the six-eyed *Avicularioidæ*. In 1873 L. Koch established the first under the name of *Masteria*, and in 1889 E. Simon founded another, for which he proposed the name *Accola*. Of these the first was founded on a single species obtained on the Island of Ovalau, and was described by L. Koch as *Masteria hirsuta* in his monograph "Die Arachniden Australiens," pp. 457-459, Tab. xxxv., figs. 5-5*d*. The genus and species established by E. Simon as *Accola lucifuga* were described in Ann. Soc. Ent. France, 1889, p. 191.*

Suborder ARANEÆ VERÆ.

First Section ARANEÆ VERÆ CRIBELLATÆ.

Family ULOBORIDÆ.

Genus ULOBORUS, Latr.

6. ULOBORUS FLAVOLINEATUS, sp.nov.

(Plate VII., figs. 3, 3*a*.)

♀. Cephalothorax 5·9 mm. long, 4 mm. broad; abdomen 12·5 mm. long, 4·2 mm. broad.

Cephalothorax moderately convex, sparingly clothed with yellowish pubescence. *Caput* high, arched, yellow-brown. *Clypeus* moderately convex, median area and margins yellow-brown, and the intervening lateral bars pale yellow; radial grooves distinct, and the median depression deep and strong. *Marginal band* narrow.

* Hist. Nat. des Araignées, 2nd Ed., Vol i., 1892, pp. 189-190.

Eyes black, arranged in two curved rows of four each, the curvature directed forwards; the eyes comprising the anterior row are somewhat smaller than those of the second.

Legs long, strong, with yellowish and yellow-brown annulations, moderately clothed with short, dark brown hairs, and armed with short, strong, dark brown spines. Relative lengths: 1, 4, 2, 3.

Palpi long, similar in colour and armature to the legs.

Falces long, strong, divergent at apex, moderately clothed with long dark hairs; the margins of the furrow of each falx are armed with a series of teeth, those of the inferior margin being smaller than those of the superior; the superior margins are also furnished with a dense brush of moderately long, dark hairs.

Maxillæ convex, long, strong, dark brown, somewhat club-ended, inclining inwards, clothed with long, dark brown hairs, the inner margins furnished with dense dark brown scopulæ.

Labium long, convex, apex rounded-off, compressed at base, yellowish, clothed with long dark brown hairs.

Sternum of normal shape, dark brown, with a narrow lateral band of pale yellow; the surface glossy, clothed in the median area with coarse dark hairs, and laterally with short pale yellowish pubescence.

Abdomen long, cylindrical, convex, moderately overhanging base of cephalothorax; the colour is dark brown generally, though somewhat lighter in front; on the inferior surface there [illegible]

8. AMAURORIUS INORNATUS, L. Koch.
Loc.—Neneba, 9th Nov., 1896.

Second Section ARANEÆ VERÆ ECRIBELLATÆ.

Family THERIDIIDÆ.

Genus ARGYRODES, E. Sim.

9. ARGYRODES GRACILIS, L. Koch.
Loc.—Boirave, at 1,500ft.; July, 1896.

Genus THERIDION, Walck.

10. THERIDION TEPIDARIORUM, C. L. Koch.
Loc.—Neneba, Nov., 1896.

Family ARGIOPIDÆ.

Subfamily TETRAGNATHINÆ.

Genus TETRAGNATHA, Latr.

11. TETRAGNATHA RUBRIVENTRIS, Dol.
Loc.—Boirave and Rossel Island.

12. TETRAGNATHA CYLINDRICA, Walck.
Loc.—Rossel Island.

13. TETRAGNATHA SERRA, Dol.
Loc.—Neneba, Nov., 1896.

Genus ARGYROEPEIRA, Emer.

14. ARGYROEPEIRA CELEBESIANA, Walck.
Loc.—Mount Scratchley, at 12,200ft., and Tamata Station, Mambare River.

15. ARGYROEPEIRA GRATA, Guér.
Loc.—Panneata.

Subfamily NEPHILINÆ.

Genus NEPHILA, Leach.

16. NEPHILA MACULATA, Fab.

Loc.—Neneba, Mount Scratchley, at 4,000 and 5,000ft; Mount Scratchley, at 12,200ft.

17. NEPHILA MACULATA, Fab., var. WALCKENÆRII, Dol.

Loc.—Mount Scratchley, at 12,200ft.

18. NEPHILA MACULATA, Fab., var. PENICILLUM, Dol.

Hab.—New Guinea.

Subfamily ARGIOPHINÆ.

Genus ARGIOPE, Aud. et Sav.

19. ARGIOPE ÆTHEREA, Walck.

Loc.—Mount Scratchley, at 12,200ft.; and Rossel Island.

20. ARGIOPE ÆTHEREA, Walck., var. DEUSTA, Thor.

Loc.—Panneata, Louisiade Group.

21. ARGIOPE ÆTHEREA, Walck., var. ANNULIPES, Thor.

Loc.—Mount Scratchley, at 12,200ft.

22. ARGIOPE ÆMULA, Walck.

Loc.—Mount Scratchley, at 12,200ft., 3rd July, 1896; Vanapa

25. CYRTOPHORA VIRIDIPES, Dol.

Loc.—Panneata.

26. CYRTOPHORA SIMONI, sp.nov.

(Plate VII., figs. 4, 4*a*.)

♀. Cephalothorax 8·2 mm. long, 6·3 mm broad; abdomen 14·9 mm. long, 8 mm. broad.

Cephalothorax convex, pale yellowish, hairy. *Caput* moderately high, arched, truncated in front, clothed with silvery pubescence. *Clypeus* broad, deeply indented at centre, radial grooves indistinct. *Marginal band* narrow.

Eyes black and disposed in three groups; of these, those comprising the median series are the largest; the anterior median pair are separated from each other by a space equal to fully twice their individual diameter; the posterior median pair are separated from their anterior neighbours by a space equal to fully three times their individual diameter, and from each other by about twice their diameter; lateral eyes oblique, and contiguous, minute, and separated from the median group by about five times their individual diameter.

Legs long, strong, tapering, yellow-brown, moderately hairy, and armed with strong black spines; tarsi black. Relative lengths: 1 = 2, 4, 3.

Palpi short, similar in colour and armature to legs.

Falces long, yellowish, arched, divergent at apex; the margins of the furrow of each falx are each armed with a row of four teeth.

Maxillæ short, broad, divergent, arched, furnished with long black bristles, yellow-brown except at inner margins and apices, which are pale yellowish.

Labium concolorous, short, broad, arched, and rounded off at apex.

Sternum shield-shaped, arched, dark brown, but with a broad median, longitudinal band of yellow, commencing in front, and terminating near to posterior extremity; on each side there are

three tubercles, and at the posterior extremity one; the surface is moderately clothed with fine dark pubescence, and long black bristles.

Abdomen oblong-ovate, projecting over base of cephalothorax, and furnished with two tubercles near anterior extremity, the inner angles of which are of a dull brownish colour, and the outer pale yellowish, and densely clothed with silvery pubescence; the general colour is tawny, relieved by fine dark brown markings, and the upper surface and sides are ornamented with symmetrical patches of silvery pubescence; on the superior surface of the abdomen there are six strongly defined punctures, the first pair of which are the largest, and are broader than long; these are situated towards the middle of the abdomen, and are separated from each other by about 3 mm; the second pair are separated from the latter by a space equal to about 2½ mm., and from each other by about 2 mm.; the third pair are separated from the second by a space slightly in excess of that dividing the first and second pairs, and again from each other by about 2 mm; in addition to the three series of punctures enumerated there is also a small and exceedingly minute pair placed midway between but a little above the two punctures constituting the second pair; the inferior surface is dark brown, but is relieved by two lateral, slightly curved longitudinal bands of pale yellow; between those bands there is a series of eight pale yellowish spots arranged in

the series collected. I have dedicated this species to my steemed correspondent, Mons. E. Simon.

27. CYRTOPHORA ALBO-PUNCTATA, sp.nov.

(Plate VII., fig. 5.)

♀. Cephalothorax 10·3 mm. long, 8 mm. wide; abdomen 16·8 mm. long, 11·7 mm. wide.

Cephalothorax convex, dark brown, hairy. *Caput* moderately high, arched, truncated in front, the surface and sides clothed with fine short hoary hairs. *Clypeus* dark brown, broad, arched, deeply depressed at centre, clothed with moderately long hoary hairs; radial grooves indistinct. *Marginal band* pale yellowish.

Eyes dark brown; those forming the median group are seated on a tubercular eminence, which is nearly twice as long as it is broad; of this group the anterior eyes are separated from each other by a space equal to rather more than twice their individual diameter, and the posterior pair by about two diameters; lateral eyes are seated obliquely upon small tubercles, but are not contiguous.

Legs long, strong, tapering, dark brown, nearly black, and armed with long black spines; trochanters clothed above and at sides with long, coarse black hairs, and below with short yellowish pubescence; the femurs, tibiæ, metatarsi and tarsi clothed entirely with black hairs. Relative lengths: 1, 2, 4, 3.

Palpi yellowish-brown, moderately long, clothed with black hairs, and armed with long dark brown spines.

Falces moderately long, arched, apices divergent; the prevailing colour is yellow, except at the tips, where the outer margins are nearly black; the upper margin of the furrow of each falx is armed with a series of four teeth, and the lower three; fangs dark brown, wine-red at tips.

Maxillæ short, broad, strong, arched, divergent, clothed with long, coarse black hairs or bristles; black, with exception of inner margins which are pale yellowish.

Labium short, broad, arched, black, with the exception of the apex which is pale yellowish.

Sternum shield-shaped, tuberculated laterally, arched, black, with yellow median, longitudinal bar, surface clothed with long black hairs and bristles.

Abdomen oblong-ovate, arched, boldly projecting over base of cephalothorax; anterior extremity yellow, thence dark brown, almost black, to posterior extremity where there is a pale U-like mark, the lines of which are somewhat uneven; in addition to this, there is a series of rather large and small pale yellowish and white spots distributed over the superior surface and sides; the two abdominal tubercles are small and obtuse, black at the inner angles, and pale yellowish on the outer; the sides are black, with uneven yellowish markings near the anterior extremity; inferior surface dark reddish-brown, but relieved by two narrow lateral, longitudinal, slightly curved yellowish lines, between which there is a series of eight pale yellowish spots, arranged in pairs.

Epigyne a small, transversely oval, dark brown tubercular eminence, the upper lip of which is sinuous and overhanging; the lower lip is also sinuous in outline and deeply cleft at the centre;

Cephalothorax dark mahogany-brown, convex, sparingly clothed with long, hoary hairs or bristles. *Caput* high, arched, obtusely truncated in front, sparingly clothed at sides and base with long, hoary hairs. *Clypeus* broad, arched, sparingly clothed with long, hoary hairs; median depression and radial grooves indistinct.

Eyes glossy, black, and arranged in three groups; the median series are seated on a somewhat quadrangular tubercular eminence, and of these the anterior pair are separated from each other by a space equal to fully twice their individual diameter; the lateral pairs are minute, and seated obliquely upon small tubercles, but are not contiguous.

Legs long, strong, tapering, dark brown, with yellowish annulations, clothed with yellowish hairs, and armed with long and strong black spines. Relative lengths: 1, 2, 4, 3.

Palpi similar in colour, clothing, and armature to legs.

Falces strong, slightly divergent at tips, glossy brown, sparingly clothed with hoary hairs; each margin of the furrow of each falx is armed with a row of three strong teeth.

Maxillæ strong, broad, moderately arched, divergent, of a tawny colour with the exception of the inner margins, which are pallid; the sides sparingly clothed with short, hoary hairs.

Labium short, broad, rounded off at apex; colour tawny, apex pallid.

Sternum shield-shaped, glossy, brown, moderately arched, and sparingly clothed with hoary hairs.

Abdomen ovate, boldly projecting over base of cephalothorax, arched in front, depressed at centre; superior surface of a saffron-yellow, with a median longitudinal bar, which is narrow in front, but gradually widens out towards the centre, and then narrows off again; in addition to this, there is also a series of irregular dark brown streaks and markings at anterior extremity; abdominal punctures deep and dark brown; at posterior extremity there are two prominent tubercular eminences placed one behind the other; sides dark brown, almost black, sparingly clothed with yellowish pubescence; inferior surface of a dull, dirty brown tint,

relieved by two large lateral patches of white situated about midway between epigyne and spinners.

Epigyne a dark brown, glossy, tubercular eminence, from the anterior angle of which there is a narrow, elongated, obtuse-pointed protuberance, the latter being directed towards the spinners.

Loc.—Neneba, 9th November, 1896.

Genus GASTERACANTHA, Sund.

32. GASTERACANTHA TÆNIATA, Walck.

Loc.—Vanapa Valley; March, 1897.

33. GASTERACANTHA CRUCIGERA, Bradley.

Loc.—Boirave, at 1,500ft.; July, 1896.

34. GASTERACANTHA HEPATICA, L. Koch.

Loc.—Panneata.

Family THOMISIDÆ.

Eyes dark brown, equidistant, disposed in two rows, of which the anterior is strongly recurved and the posterior only slightly so; the anterior lateral eyes are the largest of the group.

Legs robust, yellow-brown, covered with brown granulations, and clothed with yellowish pubescence; the anterior femora are armed with a series of oblique spines; the tibiæ and metatarsi are also furnished with strong spines; claws serrated near their base. Relative lengths: 2, 1, 3, 4.

Palpi short, robust, similar in colour and armature to legs.

Falces robust, convex, yellow-brown, and clothed rather sparingly with long, coarse, yellow hairs.

Maxillæ yellowish, long, robust, convex, slightly constricted at their centre; apices inclining inwards.

Labium long, coniform, convex, somewhat darker than maxillæ.

Sternum cordate, convex, glossy, yellow and sparingly hairy.

Abdomen sub-pentagonal, broader than long, obtusely truncated in front, slightly projecting over base of cephalothorax; it is narrowest in front, but widens out boldly until a distance of four millimètres has been obtained, from whence it retreats posteriorly; at a distance of 4·7 mm. or thereabouts there are two large black spots arranged in a transverse line and separated from each other by a space equal to about two millimètres; the superior surface and sides are pale yellow, covered with brown granulations, and clothed with very fine yellowish pubescence; inferior surface convex, pale yellowish, with whitish reticulations, and sparingly clothed with very short yellowish pubescence.

Epigyne a small, bilobed, tubercular eminence.

Loc.—Neneba; 9th November, 1896.

Genus DIÆA, Thor.

37. DIÆA 7-PUNCTATA (?), L. Koch.

Loc.—Neneba; 9th November, 1896.

This specimen was rather too immature to determine with safety, but it is probably a female of *Diæa 7-punctata*, L. Koch.

38. DIÆA OCELLATA, sp.nov.

(Plate VII., figs. 8, 8a.)

♀. Cephalothorax 1·8 mm. long, 1·5 mm. broad; abdomen 4·6 mm. long, 2 mm. broad.

Cephalothorax pale yellow, faintly tinged with green, broad, arched, glossy, devoid of hairs. *Caput* arched, obtusely truncated in front, pale yellowish, faintly suffused with green at base, and with pink within the ocular region: normal grooves faintly distinct. *Clypeus* broad, pale yellowish, faintly suffused with green, median depression and radial grooves barely discernible. *Marginal band* narrow.

Eyes black and arranged in two strongly recurved series; the median eyes of each series are the smallest of the group: lateral eyes elevated on small but prominent tubercles of a light greyish colour.

Legs moderately strong, tapering, yellowish, moderately clothed with very fine and short yellowish hairs, and armed with moderately strong spines. Relative lengths: 1, 2, 4, 3.

Palpi short, similar in colour, clothing, and armature to legs.

Falces short, arched, glossy, pale yellowish.

Maxillæ pale yellowish, long, arched, apices inclining inwards.

Labium concolorous, arched, long, conical.

Sternum concolorous, also arched, glossy and pyriform.

Genus Xysticus, C. Koch.

39. Xysticus obscurus, sp.nov.

(Plate VII., fig. 9.)

♀. Cephalothorax 1·5 mm. long, 1·5 mm. broad; abdomen 2·3 mm. long, 1·7 mm. broad.

Cephalothorax as broad as it is long, convex, smooth, dark brown, glossy. *Caput* obtusely truncated in front, sparingly clothed with short hairs; slightly depressed between the four median eyes. *Clypeus* broad, arched, sparingly clothed with short hairs. *Marginal band* narrow.

Eyes black, arranged in two recurved rows; each eye is widely separated from its neighbour, equidistant, and the four comprising the median group are much the smallest of the series, and are so arranged as to form a trapezium.

Legs strong; the first and second pairs are much the longest, strongest, and darkest in colour; the trochanters are dark and similar in colouration to the cephalothorax; the patella of each is long, strong, yellow-brown above and at the base, but dark brown at the sides and extremity; the femoral joints, tibiæ, and metatarsi are each yellow-brown with a broad, dark, median annulation; they are armed with long, strong, dark brown spines, and clothed with long, coarse, dark hairs; the third and fourth pairs are yellowish, with dark brown annulations at the joints, but similar in clothing and armature to the anterior pairs; tarsal claws long, strong, curved, and armed with small teeth. Relative lengths: 1 = 2, 4, 3.

Palpi moderately long, strong, and similar in colour and armature to the legs; the first two joints are pale yellowish, the remainder reddish-brown.

Falces dark brown, glossy, moderately long, powerful, arched.

Maxillæ long, dark brown, arched, inclining inwards.

Labium concolorous, long, coniform, arched, rounded off at apex.

Sternum long, shield-shaped, smooth, moderately arched, glossy.

Abdomen ovate, arched, moderately overhanging base of cephalothorax; *superior* surface dark brown, mottled with yellow: *inferior* surface yellow.

The *epigyne* is situated in a broad and deeply-grooved recess.

Loc.—Neneta; November, 1896.

Family CLUBIONIDÆ.

Subfamily SPARASSINÆ.

Genus HETERODPODA, Latr.

40. HETERODPODA SALACIA (?) ♂, L. Koch.

Loc.—Boirave, at 1,500ft.

Genus SARDTES, Sund.

41. SARDTES PROCERUS, L. Koch; (immature).

Loc.—Tamata Station, Mambare River.

diameter, and from their lateral neighbours by fully two diameters; the space intervening between the two rows is equal to twice the diameter of one of the larger eyes.

Legs long, robust, moderately clothed with yellowish hairs, and armed with long strong spines; trochanters annulated with yellow and dark brown; femora brown, sparingly hairy; tibiæ annulated with dark brown and yellow-brown, and clothed rather thickly with yellowish hairs; metatarsi yellowish-brown; tarsi furnished with scopulæ, the claws long and serrated. Relative lengths: 2, 1, 4, 3.

Palpi yellowish-brown, thickly clothed with long coarse hairs; armature similar to legs.

Falces long, robust, yellow-brown, with four longitudinal dark brown bars commencing at base, and continuing to near the apex; the inner margins of each falx are furnished with scopulæ of long yellowish hairs, and the furrows are furnished with strong black teeth, the lower having 4, and the upper 2.

Maxillæ long, strong, arched, slightly compressed at the middle, pale yellow, moderately hairy, and the inner apical margins furnished with long yellowish scopulæ.

Labium longer than broad, concolorous.

Sternum shield-shaped, pale yellow, clothed with moderately long coarse hairs.

Abdomen ovate, hairy; superior surface yellowish-grey with obscure dark markings similar to those of *S. procerus*, L. Koch; sides and inferior surface yellowish-grey.

Epigyne small, convex, bilobed.

Loc.—Neneba, Mount Scratchley, at between 4,000ft. and 5,000ft.; and Boirave, at 1,500ft.; July, 1896.

Family CLUBIONIDÆ.

Subfamily CLUBIONINÆ.

Genus CLUBIONA, Walck.

43. CLUBIONA VACUUA, L. Koch; (immature).

Loc.—Neneba, Mount Scratchley.

44. CLUBIONA ALVEOLATA (?), L. Koch; (immature).

Loc.—Neneba, November, 1896.

45. CLUBIONA GIULIANETTI, sp.nov.

(Plate VII., figs. 11, 11*a*.)

♂. Cephalothorax 4 mm. long, 2·8 mm. wide; abdomen 4·9 mm. long, 2·5 mm. wide.

Cephalothorax ovate, arched, yellow, sparingly pubescent. *Caput* yellowish, arched, obtusely truncated in front, sloping downwards towards ocular area, where the tint is dark brown; a thin dark brown longitudinal thread-like median line runs down the centre from near the ocular area, and terminates at the central median depression of the clypeus; normal grooves faintly distinct. *Clypeus* yellowish, arched, radial grooves faintly distinct. *Marginal band* narrow.

Eyes of a pearl-grey lustre with black rings arranged in two rows, of which the anterior is the shortest, and is recurved; the eyes of the latter are of equal size, and are separated from each other by a space equal to once their individual diameter; the posterior row is procurved; the two median eyes are separated from each other by a space equal to rather more than twice their individual diameter, and each again from its lateral neighbours by about two diameters.

Maxillæ long, arched, converging inwards, reddish-brown; apices thickly fringed with long coarse hairs.

Labium concolorous, longer than broad, apex obtusely truncated.

Sternum long, narrow, somewhat shield-shaped, yellowish, glossy, smooth, moderately convex, sparingly clothed with colourless hairs.

Abdomen oblong-ovate, moderately projecting over base of cephalothorax, yellowish, moderately clothed with short colourless hairs; seated about one-third the length of the abdomen there are two dark circular spots or depressions, and these are separated from each other by a space equal to twice their individual diameter; below these, again, there are two other depressions slightly larger than the foregoing, and separated from them by a space equal to about three times their individual diameter; from the first two depressions a delicate tracery proceeds, the lines of which unite immediately before the second pair of spots, and proceeds from thence in a single line towards the spinners; the sides and inferior surface are lighter in colour than the superior.

♀. Cephalothorax 4·8 mm. long, 3·5 mm. broad; abdomen 6·3 mm. long, 3·6 mm. broad.

Cephalothorax longer than broad, yellowish, sparingly pubescent. *Caput* arched, obtusely truncated in front, yellowish at base, yellow-brown at apex, dark brown in front; there is also a thread-like median line commencing near the apex and terminating at the central median depression of the clypeus. *Clypeus* arched, radial grooves faintly distinct.

Eyes similar in arrangement to those of the male.

Legs long, strong, hairy, and armed with long strong spines; trochanters and femora yellowish, tibiæ and metatarsi yellow-brown. Relative lengths: 4, 1, 2, 3.

Palpi similar in colour, clothing and armature to legs.

Falces long, robust, arched, divergent at apex, dark mahogany brown, sparingly hairy.

Maxillæ long, robust, arched, glossy, of a rich mahogany-brown, the surface moderately pubescent, inner apical edges furnished with scopulæ.

Labium longer than broad, obtusely truncated at apex, concolorous.

Sternum long, narrow, somewhat shield-shaped, yellow, glossy, sparingly pubescent.

Abdomen oblong-ovate, convex, hairy, moderately projecting over base of cephalothorax; the abdominal punctures are similar to those of the ♂, but the delicate tracery noticeable in the latter is not present in ♀ examples; the sides and inferior surface pale yellowish.

Epigyne large, slightly raised, arched, bilobed, yellowish-brown at base, dark brown above.

Loc.—Neneba, 9th November, 1896.

Genus CHIRACANTHIUM, C. Koch.

46. CHIRACANTHIUM LONGIMANUM (?), L. Koch.

Loc.—Neneba, 9th November, 1896.

Subfamily LIOCRANINÆ.

Genus ARGOCTENUS, L. Koch.

Genus DENDROLYCOSA, Dol.

49. DENDROLYCOSA DOLOMEDES (?), Dol.

Loc.—Neneba, 9th November, 1896.

50. DENDROLYCOSA EXILIS, Thor.; (immature).

Loc.—Neneba, 9th November, 1896.

Genus TRICHOSA, C. L. Koch.

51. TRICHOSA PULCHELLA ♂ (?), Thor.

Loc.—Neneba, 9th November, 1896.

Family ATTIDÆ.

Genus ICIUS, E. Sim.

52. ICIUS VIDUUS, L. Koch.

Loc.—Boirave, at 1,500ft., July, 1896; Tamata Station, Mambare River.

Genus TAPINATTUS, Thor.

hair; in addition to these, there are also a few short white hairs scattered over superior surface and at the sides; inferior surface dark brown, sparingly clothed with hoary hairs.

[When immersed in alcohol the white hairs are not visible.]

Loc.—Tamatava Station, Mambare River.

Genus PLEXIPPUS, C. Koch.

57. PLEXIPPUS LATERICIUS, Thor.

Loc.—Tamatava Station, Mambare River.

58. PLEXIPPUS SEX-MACULATUS (?), C. Koch.

Loc.—Boirave, at 1,500ft., July, 1896.

Genus BATHIPPUS, Thor.

59. BATHIPPUS MONTROUZIERI, Luc., var. PAPUANUS, Thor.

Loc.—Rossel Island, 11th July, 1890.

60. BATHIPPUS DILANIANS, Thor.

Loc.—Neneba, November, 1896.

consequently determination is difficult, and at the best unsatisfactory.

Genus COCORCHESTES, Thor.

65. COCORCHESTES RUFIPES ♂, Thor.

Loc.—Boirave, at 1,500ft., July, 1896.

Order SCORPIONIDÆ.

Family PANDINOIDÆ.

Subfamily PANDININI.

Genus HORMURUS, Thor.

66. HORMURUS CAUDICULA, L. Koch.

Loc.—Boirave, at 1,500ft., July, 1896; Neneba (immature specimen), November, 1896.

Order PEDIPALPI.

Suborder AMBLYPYGI.

Family PRYNOIDÆ.

Genus PHRYNUS, Latr.

67. PHYRNUS GRAYI, P. Gerv.

Loc.—Boirave, at 1,500ft., July, 1896.

Obs.—Two specimens of this interesting species were obtained, and these, when compared with Walckenaer's description, appear so close that there can be little doubt as to their identity.

The line of demarcation drawn by Wallace in his "Geographical Distribution of Animals," based chiefly on vertebrates is hardly supported by the testimony of the invertebrate fauna. The distinguished author, as every scientific student knows, held that the fauna of the Philippine Islands was distinct from that of Papua. The former he included in the Indo-Malayan region, and the latter in the Austro-Malayan. In dealing with "The Land Molluscan Fauna of British New Guinea," Hedley says:—"Wallace's line, so conspicuous a severance among the vertebrates, appears to be quite blotted out, when the distribution of animals is regarded from a molluscan standpoint. No sharp break occurs

between the Malayan fauna as exemplified in Borneo or the Philippines and in New Guinea. All the characteristic Malayan forms, *Atopos*, *Xesta*, *Helicarion*, *Microcystina*, *Trochomorpha*, *Obba*, *Chloritis*, *Cochlostyla*, *Pupina* and *Diplommatina* are common to both regions. The Solomon Islands, Fiji, Samoa, etc., appear by the light of the Papuan shells to be inhabited by an eastern extension of this Malayan fauna, which has also overflowed into Queensland."* The extension of *Phrynus grayi* from the Philippines to the Papuan region, would therefore appear to be in accordance with the theory put forward by Hedley.

Order OPILIONES.

Sub-order OPILIONES PLAGIOSTETHI.

Genus GAGRELLA, Stol.

68.—GAGRELLA XANTHOSTOMA, Thor.

Loc.—Boirave, at 1,500ft., July, 1896.

CONTRIBUTIONS TO A KNOWLEDGE OF THE FAUNA OF BRITISH NEW GUINEA.

No. I.

Communicated by Thos. Steel, F.L.S., F.C.S.

Introduction.

Some time ago I received from my friend, the Rev. H. P. Schlencker, of the London Missionary Society, a miscellaneous collection of natural history specimens from the vicinity of Fife Bay, British New Guinea.

As our knowledge of the distribution of the Papuan fauna is but meagre, and Mr. Schlencker's collection comprises some forms of considerable interest, I have placed the following account of it before the Society. The various groups have been worked out by the gentlemen whose names appear at the head of each report, and my thanks are due to each of them for the hearty readiness with which they accepted my invitation to undertake the work of examination. I have pleasure in recording my gratitude to Mr. Schlencker for the enthusiastic manner in which he responded to my request for specimens and for his promise of further help in the same direction.

With few exceptions the specimens reached me in an excellent state of preservation.

Fife Bay is situated on the south coast of British New Guinea, Lat. 10° 35′ S., Long. 150° E.

i. Lacertilia and Batrachia.—By A. H. S. Lucas, M.A., B.Sc.

Lacertilia.

The collection of Lizards from Fife Bay included as many as 16 species.

Three of the Geckos, though they are certainly common kinds, and plentifully distributed in the S.E. coast district, do not seem to have been formally recorded from New Guinea, though they are known to have a wide extension in the Western Pacific. These are *Gehyra oceanica*, *Gymnodactylus pelagicus*, and *Lepidodactylus lugubris*.

Homolepida englishi was described by De Vis in the Proceedings of this Society, in 1890, from a single specimen obtained from the St. Joseph River. The present example from Fife Bay answers closely to his description.

Keneuxia smaragdina was found by Dr. R. Semon in New Guinea, and also a new species of Skink which was described by Oudemans as *Liolepisma semonis* in Semon's Zool. Forschungsreisen, 1894. Of the latter there are two examples from Fife Bay.

All the other species which are represented in this collection are recorded as Papuan in the British Museum Catalogue of Lizards (Boulenger).

SCINCIDÆ.

L. novæ-guineæ, Meyer.
L. semonis, Oudemans.
Emoa cyanogaster, Lesson.
E. cyanura, Lesson.
Ablepharus boutonii, Desjardins.

BATRACHIA.

Three frogs were sent in the collection.

Hyla arfakiana, Peters and Doria.—One example, agreeing well with the description and figures in the Ann. Mus. Genova, 1878, except that the tympanum is relatively larger in our specimen, being in diameter half as large as the eye. The authors describe extreme variation in colour. The present specimen is (in spirit) purplish-brown above and brownish below; the thighs are purple, spotted with whitish behind.

Batrachopsis melanopyga, Doria.—Two individuals, measuring 45 and 47 mm. respectively from snout to vent. The tympanum is nearly as long in vertical diameter as the eye is wide. There is no perceptible dark streak on the canthus rostralis. Otherwise the specimens agree with the generic and specific descriptions.

ii. OPHIDIA and PISCES.—By J. DOUGLAS OGILBY.

The collection of snakes numbers eight, belonging to the following species:—

1. TROPIDONOTUS (?) PICTURATUS.

According to Dr. Boulenger this is a widely spread and very variable species; and as it seems to me that it may be possible to break it up into well-marked subspecies or local races, I think it advisable to give the following description of the Fife Bay specimen in order to facilitate comparison with specimens from other localities:—

Eye as long as its distance from the anterior border of the nostril. Rostral much broader than deep, just visible from above; internasals a little broader than long, as long as the prefrontals,

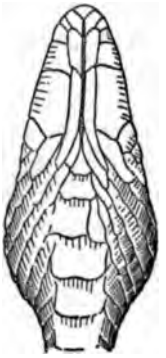
broadly truncate anteriorly; frontal once and one-third as long as broad, longer than its distance from the end of the snout, much shorter than the parietals; loreal longer than deep; 2 pre- and 3 postoculars; temporals 1 + 1; 8 upper labials, the third, fourth, and fifth entering the eye; five lower labials in contact with the anterior chin-shields, which are but little smaller than the posterior. Scales in 15 series, the outer conspicuously keeled; ventrals 140; anal divided; subcaudals 82. Olive-green; labials yellow, with dark edges; below yellowish, the subcaudals dark edged.

From Dr. Boulenger's description this example differs in having the internasals broader than long, the frontal only one and one-third times as long as broad and much shorter than the parietals, the loreal longer than deep, and the outer series of scales conspicuously keeled. *Katophis plumbea*, Macleay, agrees much better with Dr. Boulenger's description, but in all three examples the rostral is twice as broad as deep, and the loreal is as long or longer than deep. The shape and position of the temporals are very variable, no two specimens being alike in this respect. So

T. ater, Macleay, only differs from *T. picturatus* in having a longer and narrower frontal shield, which in the two examples is from one and three-fourths to one and nine-tenths times as long as wide, and is much longer than the parietals. *T. angusticeps* cannot be separated from *T. picturatus*.

2. DENDRELAPHIS SCHLENCKERI, sp.nov.

Maxillary teeth 20. Eye very large, as long as its distance from the middle of the nostril. Rostral about twice as broad as deep, just visible from above; internasals as long as the prefrontals; frontal once and a half to once and three-fifths as long as broad, much longer than its distance from the end of the snout, shorter than the parietals; loreal elongate, between twice and thrice as long as broad; one pre- and two postoculars, the lower small; temporals 2 + 2 or 1 + 2; eight upper labials, fourth and fifth entering the eye; four lower labials in contact with the anterior chin-shields, which are much shorter than the posterior, the fifth greatly enlarged. Scales in 13 rows. Ventrals 185 to 187; anal divided; subcaudals 118 to 132. Upper surface olive-brown, the neck and anterior portion of the body much darker, with the vertebral series of scales bluish-white, tipped with pale brown, forming a conspicuous band; a narrow black streak from the snout to the neck; upper labial, lower surface of head, and throat yellow; lower surface of body bluish-white, indistinctly spotted with darker. (Named for its discoverer, the Rev. H. P. Schlencker of the London Missionary Society.)



(× 1½)

This species is closely allied to *Dendrelaphis papuensis*, but differs constantly in the larger eye, longer frontal, and decreased number of lower labials in contact with the anterior chin-shield. Five specimens are in the collection, the largest measuring 1,100 millimeters, the tail being 350.

Note by T. Steel.—I have placed the type specimen of this snake in the Australian Museum, Sydney (Register No. R. 2380), and purpose sending a specimen to the British Museum of Natural History.

3. DIPSADOMORPHUS IRREGULARIS.

One specimen.

4. PLATURUS sp.

I am unable to determine to which species this example should be referred—*schistorhynchus* or *muelleri*. The rostral is deeper than broad; there is no azygous shield between the nasals, but a large one is present between the prefrontals; the frontal is longer than the parietals; eight upper labials; 1 + 2 temporals; scales in 22 series; ventrals 238; subcaudals 35. Black annuli 66.

From *muelleri*, with which the example agrees best, it differs in the presence of an azygous prefrontal shield, the frontal exceeding the parietal, and the number of series of body scales.

I am not quite satisfied with the generic names assigned to

name can be defended on any of the laws which govern synonymy. The three other species referred by Schneider to the genus *Hydrus* belong to the other groups of colubrine snakes; they are: (1) *H. granulatus*, an aglyphous form, of which the correct name is *Chersydrus granulatus*, (2) *H. enhydris* (l.c. p. 245), and (3) *H. rhynchops* (l.c. p. 246), opisthoglyphous snakes, which are now generally recognised as *Hypsirhina enhydris* and *Cerberus rhynchops*. Each of these species has an equal title, perhaps I should be more correct in saying an equally bad title, to the name *Hydrus* as the *Anguis platura* has. I have not the books of reference necessary to determine whether *Pelamis* can be used for this species, but it is significant that no less than nine pages (357 to 366) separate the diagnosis of the genus *Pelamis* from that of the species *bicolor*. In any case *Hydrus* is only a synonym of *Laticauda*, *Platurus*, Daudin, which Dr. Boulenger uses, being later than either of these. I would, therefore, prefer to call our species *Laticauda muelleri*.

Pisces.

The collection of fishes contains 10 specimens, all of which are in bad condition, and, with the exception of two (Nos. 2 and 6), immature. They are as follows:—

1. *Plotosus arab*, Forskål.
2. *Lycodontis fimbriatus*, Bennett.
3. *Atherina* sp.
4. *Therapon jarbua*, Forskål.
5. *Monacanthus tomentosus*, Linnæus.
6. *Periophthalmus koelreuteri*, Pallas.
7. *Platophrys* sp.

iv. Insecta and Arachnida—By W. J. Rainbow.

The collection of insects, etc., enumerated below is essentially typical of the Arthropod fauna of the Austro-Malayan region. Many of them are peculiarly Papuan; some few are found in other parts of the Pacific; and two at any rate, namely, the cockroach, *Panesthia æthops*, and the centipede, *Scolopendra morsicans*, have a world-wide distribution.

Coleoptera.

Family Carabidæ.

Therates cæruleus, Latr.; this species is also found in Java, and was described by Gory as *T. javanicus* in Mag. Zool., Vol. 39, 1831.

Tricondyla aptera, Oliv.

Family Staphylinidæ.

Actinus macleayi, Oll.; originally recorded from Cairns, N. Queensland.

Family Lucanidæ.

Leptaulax dentatus, (?) Web.; other localities are East Indian Archipelago, Timor.

Family Scarabæidæ.

Subfamily Melolonthinæ.

Lepidiota 5-lineata, Macl.

Family ŒDEMERIDÆ.

Nacerdes transmarina, Rainb.; originally obtained by Mr. C. Hedley, F.L.S., at Funafuti, Ellice Group.

Nacerdes sp.

Family CURCULIONIDÆ.

Rhinoscaphus bicincta.; Woodlark Island.

Subfamily BRACHYDERINÆ.

Pachyrhynchus sp.

Subfamily OTIORHYNCHINÆ.

Siteutes cœruleutus, Pasc.

Subfamily CRYPTORHYNCHINÆ.

Blepiarda vittata, Pasc.

Subfamily ZYGOPINÆ.

Diomia tetragramma, Pasc.

Subfamily BARIDINÆ.

Myctides nitidulus, Pasc.

Subfamily CALANDRINÆ.

Rhyncophorus kaupi, Schauf.

Sphenophorus obscurus, d'Urv.

„ *nebulosus*, Macl.

Family BRENTHIDÆ.

Leptorhynchus angustus, Guér.

„ *linearis*, Pasc.; also Batchian, Moluccas.

Family ANTHRIBIDÆ.

Xenocerus leucogrammus, Mots.; North Australia.

Family CERAMBYCIDÆ.

Subfamily PRIONINÆ.

Mallodon sp.

Subfamily CERAMBYCINÆ.

Cæsium simplex, Gyll.; also obtained in the Philippines, Timor, Tahiti, Samoa, Australia, and New Zealand.

Tethionea unicolor, Pasc.; the Island of Aru.

Stenocerus simplex.

Subfamily LAMIINÆ.

Tmesisternus bizonatus, Blanch., = *trivittatus*, Hombr.

Monohammus longicornis, Thoms.; the Island of Aru.

Batocera boisduvali, Hope; Woodlark Island, Queensland, and New South Wales.

Gnoma affinis, Guér.

Symphyletes sp.

Family CHRYSOMELIDÆ.

Subfamily GALERUCINÆ.

Oides ornata, Balz.

Prasyptera antennata, Jacobz.

Family MANTIDÆ.

Rhombodera tamolana, Branc.; widely distributed throughout New Guinea.

Family BLATTARIÆ.

Panesthia æthops, Stoll; of world-wide distribution.

ARACHNIDA.

Family ULOBORIDÆ.

Uloborus flavolineatus, Rainb.; *vide* p. 333.

Dinopsis sp.

Family DICTYNIDÆ.

Amaurobius inornatus, L. Koch; also widely distributed throughout Australia.

Family ARGIOPIDÆ.

Tetragnatha cylindrica, Walck.; widely distributed throughout Australia.

Argiope ætheria, Walck., = *regalis*, L. Koch; Australia, Thursday Island, and New Ireland.

Argiope ætheria, Walck., var. *deusta*, Thor.

Gasteracantha crucigera, Brad.

Family LYCOSIDÆ.

Lycosa obscura, L. Koch; widely distributed throughout Australia.

SCORPIONIDÆ.

Family ANDROCTINIDÆ.

Isometrus maculatus, DeGeer; distributed throughout Oceania.

Family PANDINOIDÆ.

Hormurus australasiæ, Fab.; widely distributed throughout the Pacific.

Hormurus caudicula, L. Koch; Bowen, Rockhampton, Gayndah, and Sydney.

PEDIPALPI.

Family PHRYNOIDÆ.

Phrynus grayi, P. Gerv.; also found in the Philippines.

MYRIAPODA.

Family SCOLOPENDRIDÆ.

Scolopendra morsicans, Linn.; of world-wide distribution.

„ sp.

Family GEOPHILIDÆ.

Hymantharium sp.

iv. CRUSTACEA.—By T. WHITELEGGE.

MACROURA.

Family PALÆMONIDÆ.

PALÆMON AFFINIS, M. Edwards, Hist. Nat. Crust. ii., p. 393 (1837); Dana, U.S. Explor. Exped. Crustacea, pt. I., p. 584, pl.

v. Mollusca.—By C. Hedley, F.L.S.

The collection comprises the following mollusca, all of which are in this region abundant, and being conspicuous forms, have already been recorded from Eastern British New Guinea. For further information on the land mollusca an article on the subject in Vol. vi. Series ii. of these Proceedings may be referred to.

The land shells are:—*Nanina hunsteini*, Smith, *Papuina brumeriensis*, Forbes, *Partula similaris*, Hartman, *Helicina suprafasciata*, Sowerby, var. *sinus*, Hedley, and *Leptopoma vitreum*, Lesson.

From the brooks there are:—*Neritina pulligera*, Linn., *Melania graeffei*, Mousson, and *M. arthurii*, Brot.

The only marine mollusc is the world-wide species *Linjula anatina*, Bruguiere

vi. Oligochæta.—By J. J. Fletcher.

Family Perichætidæ.

Perichaeta sp.—Three specimens (one damaged, and one juvenile), without clitella, and in too soft a condition to allow of satisfactory determination. The setæ are minute, and very numerous per somite.

NOTES ON THE SUBFAMILY *BRACHYS*
DESCRIPTIONS OF NEW SPECIES

By Walter W. Froggatt, F.I

(Plates viii.-ix.)

Since the publication of my last contributio
gall-making coccids, several important papers
subject have appeared. Among them is a rat
upon Australian Galls* by C. H. Rübsaamen
many plates, in which he describes a numbe
whereas if he had been able to examine more
have found that most of them were only variab
already described. Maskell's *Cylindroccus a*

It is remarkable that until the last few years no gall-making coccid had been discovered outside Australia. Lately a curious udder-shaped gall has been described by Cockerell* upon the leaves of an oak (*Quercus wrighti*) at Pinos Altos, New Mexico.

In the present paper I have described several new species from different parts of Australia, added a few notes upon imperfectly described species, extended the range of others, and described the larvæ.

BRACHYSCELIS URNALIS, Tepper.

B. Schraderi, Olliff, MS.

The galls of this species were described and figured by Tepper in clusters upon *Eucalyptus uncinata* and *E. gracilis* growing at Murray Bridge, S.A. Specimens growing singly upon an undetermined Eucalypt from the neighbourhood of Tamworth, N.S.W., were described by Olliff (MS. Notes) under the name of *B. Schraderi* and published after his death by Fuller in the Agricultural Gazette, N.S.W.

I had collected specimens of this gall growing on a large scrub eucalypt, near Wellington, in 1891; they were afterwards collected growing singly upon *E. meliodora* at Goulburn; again some very fine specimens in clustering masses radiating round the branchlets, comprising upwards of a hundred galls, somewhat more slender on account of the compression than the typical form, were received from Uralla growing upon *E. polyanthema*.

The specimens from Goulburn agree with Olliff's species, and those from Uralla with Tepper's, but the difference is due to the habit of growth; a careful examination of the enclosed coccid shows that there is no specific difference.

As the descriptions given both by Fuller and by Tepper are very brief, I take the opportunity of adding a further description of the female coccid after examining a fine collection of specimens.

* Cockerell, Science, 1896, Vol. iv. p. 299.

♀. Coccid pale ochreous-yellow, anal appendages black; 5 lines in length, 1½ in diameter; dorsal surface rounded, swelling out on the sides in a line with the middle pair of legs, covered with scattered spiny hairs: first to fourth abdominal segments of uniform length, tapering sharply towards the apex; fifth to eighth armed with a row of stout spines along the apical margin; ninth more than twice the length of the preceding ones; anal appendages slender, half as long again as the ninth segment, closed at the base, but opening out at the apex. Ventral surface of the head and thoracic segments very much wrinkled; legs ferruginous, stout, claws large; thoracic segments bisected by an impressed line to the hind pair of legs; abdominal segments fringed with fine hairs.

Hab.—Uralla (Mr. G. McD. Adamson); Kenmore, near Goulburn (Mr. J. H. Maiden); Myrniong, Vic. (Mr. James Lidgett); Wellington, N.S.W. (W. W. Froggatt).

BRACHYSCELIS PILEATA, Schrader.

(Pl. VIII., fig. 1.)

Larva pale yellow, oval, rounded in front, slightly pointed at the tip of the abdomen. Antennæ 6-jointed, 1st joint conical, broad at the base, the remainder smaller and oval, thrice the length of the marginal fringe and furnished with two long hairs at the tip, nearly as long as the antennæ; eyes black, situated at the edge, behind the base of the antennæ; dorsal surface of the head, thorax and sides of the abdominal segments covered with fine short hairs. The flanged spines forming the marginal fringe as long as the thighs of the larva, close and unbroken round to the anal tip, which forms a truncate cylindrical point, with a fine hair-like filament more than half the length of the insect floating out behind on either side; tarsal claws very small, sharp, with the two digitals extending beyond on either side.

Larva No. 2.—Another form crawling about among the others had the abdomen more elongated, and the marginal fringe only flanged at the base instead of being broadly flanged at the outer edge, each spine being sharp at the

together at the base, widening out at the tips. Antennæ small, fore legs minute, situated in a slight depression on either side; last pair of legs longest, claws large.

Larva pale yellow, elongate-oval, flattened on the back, antennæ composed of 6 or 7 elongate oval joints, bearing irregular longish hairs, terminating with several stout hairs nearly as long as the antennæ. Outer margins of the segments fringed with delicate spines, each of which is flanged on either side like a feather, truncated at the tips and nearly in contact, forming a fringe round the insect except on each side of the anal extremity, which is ornamented on either side with a long slender white filament trailing out behind; on either side of the filaments the marginal spines are bifid. Legs stout and hairy, with two stout claws.

♂. Gall and coccid unknown.

This species is allied to *B. pedunculata*, Olliff, MS.; but besides the differences in the coccid, there is a very distinctive one in the gall, namely, that the apical orifice is upon a projecting tip, while in the former the tip is distinctly truncated, and the apical orifice

BRACHYSCELIS FLORALIS, n.sp.

(Pl. VIII., fig. 8; Pl. IX., figs. 9-10.)

♀. Gall dull green, 1¼ inches in length, diameter 9 lines, broadly rounded at the base, oval, tapering into a cone-shaped apex, truncated, with a slightly thickened edge, forming a rim round the small rounded apical orifice, which is situated in a convex depression; walls of chamber thick; gall-chamber 5½ lines in diameter, elongate at the apex.

This gall springs from a cluster of flower buds, and grows alone like *B. ovicola*.

♀. Coccid pale yellow, 1 inch in length, ½ inch in diameter, broadly turbinate; cephalic and thoracic segments rounded; abdominal ones very distinctly divided, tapering off sharply from the third to the tip. Dorsal surface covered with fine, short, ferruginous spines, forming a broad, irregular, parallel band from the head to the tip of the abdomen, broadest and more scattered upon

Hab.—Sydney (on *Eucalyptus* sp.; W. W. Froggatt); Port Macquarie (on *Eucalyptus* sp.; Mr. G. R. Brown).

Sphærococcus ferrugineus, n.sp.

(Pl. ix., figs. 16-20.)

♀. Coccid dark reddish-brown on the dorsal surface, dull yellow on the ventral surface; length 1¼ lines; ventral surface flat; circular; dorsal surface conical, with the anal tip showing an elongate oval mark.

♀. Gall varying from dark reddish-brown when full grown to pale green when immature, 10 lines in diameter. Ball-shaped, formed by a number of leaf-like bracts springing out from the tip or side of a twig. The coccid imbeds itself in the tip of the twig, the head being attached to the tissue which rises up on either side, forming a regular cleft. The central gall commences as a woody excrescence on the leaf bud in which the coccid is half imbedded, the tissue rising up over the coccid into a loose thin shell.

The leaf-like tufts forming the outer portion of the gall are each composed of a number of smaller bracts springing from a common centre like flowerets, forming a regular loose rounded mass. When this gall is produced upon the tip of the twig it contains a single coccid, but if it grows out on the side of a twig it often shelters two.

♂. Coccid unknown.

Hab.—Southport, Queensland, to Richmond River, N.S.W. (on *Melaleuca* sp.; W. W. Froggatt).

EXPLANATION OF PLATES.

Plate viii.

Brachyscelis pileata, Sch.

Fig. 1.—Larva (enlarged).

Brachyscelis sloanei, n.sp.

Fig. 2.—Group of three galls.
Fig. 3.—Adult female.
Fig. 4.—Anal appendages.

DESCRIPTIONS OF THE NESTS AND EGGS OF FOUR SPECIES OF AUSTRALIAN BIRDS.

By Alfred J. North, C.M.Z.S., Ornithologist, Australian Museum, Sydney.

Ephthianura crocea, Castlenau & Ramsay.

Crescent-marked Ephthianura.

This species, the most diminutive member of the genus *Ephthianura*, was one of the novelties secured by Mr. Gulliver in a collection of birds formed on the Norman River, near the Gulf of Carpentaria, North Queensland. The collection was acquired by the late Comte de Castlenau and the species jointly described by Dr. Ramsay and himself in a paper contributed to this Society in December, 1876. Subsequently, the late Mr. T. H. Boyer-Bower obtained several specimens near Derby, North-west Australia, the only other district it has been recorded from, although its range probably extends eastwards across the continent to the Norman River. A nest of this species is a small cup-shaped structure, irregularly formed on the outside of thin dried stalks of herbaceous plants, and lined inside with fine wiry grasses and rootlets. Eggs three in number for a sitting, oval in form and pure white, with minute dots and spots of blackish-red sparingly distributed over the surface of the shell; and not to be distinguished except for their slightly smaller size from those of its close congener *E. aurifrons*. Length, (A) 0·6 × 0·43 inch; (B) 0·62 × 45 inch; (C) 0·62 × 0·44 inch.

Hab.—Gulf District of Northern Queensland, North-west Australia.

Ptilotis macleayana, Ramsay.

Sir William Macleay's Honey-eater.

A nest of this species taken by Mr. J. A. Boyd from a *Mango* tree near the Herbert River on the 16th of December, 1896, is a deep cup-shaped structure slung by the rim to a thin forked

AUSTRALIAN FREE-LIVING MARINE NEMATODES.

By N. A. Cobb, Ph.D.

(Read June 29th, 1898.)

Anticoma, Bastian.

Anticoma similis, n.sp. $\frac{\cdot4\ \ 9{\cdot}6\ \ 19{\cdot}}{\cdot7\ \ 2{\cdot}4\ \ 2{\cdot}9}\ \ \frac{\cdot51}{2{\cdot}7}\ \ \frac{^{2}0\ \ 85{\cdot}}{2{\cdot}}$ 1·78 mm. This worm resembles *Anticoma acuminata*, Eb., to such an extent that I hesitated for some time to call it distinct. The differences are as follows:— (1) *porus* farther forward; (2) pectoral hairs six; (3) œsophagus at first cylindrical and narrow then widening rather suddenly behind the nerve-ring; (4) narrower; (5) other minor differences.

The perfectly plain cuticle bears only very short hairs. The pectoral hairs are closely approximated, and are arranged in longitudinal rows of six at a distance from the anterior extremity equal to one-sixth of the distance from the anterior extremity to the somewhat oblique nerve-ring. The conoid neck terminates in a head somewhat rounded in front and bearing ten setæ, each having a length nearly equal to the depth of the pharynx, and all placed opposite the middle of the pharynx. The three obscure lips are destitute of papillæ. The lateral organs (slits) occur near the ventral excretory pore, which is as far behind the cephalic setæ as the latter are behind the anterior extremity. There are no eyes. The wider anterior part of the conoid pharynx is four micromillimètres deep; thence the pharynx tapers more rapidly and ceases at eight micromillimètres. The brownish and rather thin-walled intestine is composed of cells of such a size that about ten of them are required to build a circumference; the numerous granules contained in these cells are so arranged as to give rise to

LOPHOPHAPS FERRUGINEA, Gould.

Rust-coloured Bronze-wing.

Although freely distributed in favourable situations over a wide expanse of country, the habitat of the present species, unlike its near congener *Lophophaps plumifera*, is entirely restricted to the western portion of the Australian continent. Its range extends from the Murchison River in West Australia to the Lennard River in the north-western portion of that colony. Future research will doubtless extend this range through a similar tract of country as far north as Cambridge Gulf.

For an opportunity of describing properly authenticated eggs of this species, I am indebted to Mr. A. Zietz, F.L.S., Assistant Director of the South Australian Museum. These eggs, two in number, formed part of the collection brought to Adelaide by Mr. G. A. Keartland, one of the members of the ill-fated Calvert Exploring Expedition. They were taken in March, 1897, near the Fitzroy River, North-west Australia, by Mr. J. Harris, from a slight grass-lined depression beneath the shelter of a spinifex tussock. In shape they are swollen ellipses, and are more globular than the generality of pigeon's eggs, the grain of the shell being very fine, and its surface slightly glossy. They are of a uniform pale cream colour. Length, (A) 0·94 × 0·77 inch; (B) 0·9 × 0·77 inch.

Dr. E. C. Stirling, F.R.S., the Director of the South Australian Museum, informs me that the ornithological results of the Calvert Exploring Expedition in West Australia, which include some interesting field notes and original observations made by Mr. Keartland on this and many other species, will shortly be published in the Transactions of the Royal Society of South Australia.

a distinct tessellation. The rectum is equal in length to the anal body-diameter. The ventral gland is situated in front of the cardiac collum; the duct is narrow and the ampulla elongated. The lateral fields are one-fourth as wide as the body. The anterior half of the tail is conoid; thence to the naked, somewhat swollen terminus it is cylindroid and an eighth as wide as at the anus. The caudal glands appear to be situated in front of the inconspicuous anus. The vulva is depressed; the vagina is one-half as long as the body is wide. The reflexed ovaries reach nearly the whole distance back to the vulva.

Found in sand near low-tide mark, Port Jackson, New South Wales, Australia.

ANTICOMA LATA, n.sp.—I have not seen the female of this species, which seems to be simply "one more,"—another tiresome addition. $\frac{\cdot3\ \ 10\cdot\ \ 21\cdot\ \ \ M\ \ \ 88\cdot}{\cdot6\ \ 2\cdot4\ \ 3\cdot3\ \ \ 3\cdot7\ \ 2\cdot1}$ 2·6 mm. The cuticle is not marked by striæ, but bears short and inconspicuous hairs throughout. The convex-conoid neck ends in a truncate head bearing ten setæ each one-third as long as the head is wide and all arranged opposite the middle of the pharynx. The two longitudinal rows of four closely approximated pectoral hairs occur on the neck at a distance from the anterior extremity equal to one-fourth the distance from the anterior extremity to the excretory pore. The obscure lips seem destitute of papillæ. Lateral organs, in the form of transverse slits one-half as long as the head is wide, occur on the head at a point as far behind the setæ as the latter are behind the anterior extremity. Eyes are lacking. The pharynx is very small and simple, being conoid in shape and in its widest part not above three micromillimètres wide. The cylindrical anterior half of the œsophagus is one-half as wide as the corresponding part of the neck; behind the nerve-ring, however, the œsophagus begins to expand in size and becomes in its posterior part one-half as wide as the base of the neck. When the œsophagus is viewed in optical section its lining is distinctly to be seen. The intestine, which is two-thirds as wide as the body, is separated from the œsophagus by a shallow but distinct constriction; the granules con-

clearly to be seen. Thence the food passes through the small cardia into the intestine. This latter is one-half as wide as the body and composed of cells closely packed with granules. The ventral gland is situated in front of the cardiac collum; its duct is narrow, the ampulla being sub-spherical and one third as wide as the neck. The excretory pore is situated just in front of the somewhat oblique nerve-ring. The lateral fields are only one-fifth as wide as the body. The tail is setaceous onward from its conoid anterior fourth. The slightly expanded terminus gives exit to the secretion of the caudal glands. The depressed vulva leads to a vagina one-half as long as the body is wide. The eggs are a little more than one-half as wide as the body and are three times as long as wide. The broad, reflexed part of the ovaries reach two-thirds to three-fourths the way back to the vulva and contain numerous developing ova arranged in several rows.

Found in sand near low-tide mark, Port Jackson, New South Wales, Australia.

Comesoma, Bastian.

Comesoma heterura, n.sp. It is barely possible that this species is not a *Comesoma*, for while the head is precisely like that of *Comesoma*, the spicula are decidedly different; however, we have *Oncholaimi* with short spicula and also with setaceous spicula, and why should not the same occur in *Comesoma*? I have not seen the female.

$\frac{\cdot2\ \ 5{\cdot}6\ \ 10{\cdot}}{\cdot8\ \ 2{\cdot}3\ \ 3{\cdot}}\ -M-\ \frac{40\ \ 87{\cdot}}{3{\cdot}7\ \ 2{\cdot}6}$ 2·26 mm. The thickish striated cuticle is closely and finely punctate, but not so finely as in *C. similis*. Short hairs occur on the body. The conoid neck ends in a subtruncate head bearing, nearly opposite the base of the pharynx, four spreading submedian setæ and two short papilla-like lateral ones; the submedian ones are one-half as long as the diameter of the head. I could not ascertain whether or not the three flat and obscure lips bore papillæ; none but very small and inconspicuous papillæ could have escaped the scrutiny. The anterior margin of each lateral organ is as far behind the base of the pharynx as the

latter is behind the anterior extremity; the right organ is a left-handed spiral of three winds, whilst the left one is a similar right-handed spiral. The simple toothless cup-shaped pharynx is one-third as wide as the head. The anterior part of the conoid œsophagus is one-half, and the posterior part two-thirds, as wide as the corresponding part of the neck. The lining of the œsophagus is distinctly to be seen when the organ is viewed in optical section. The thick-walled intestine, which is one-half as wide as the body, is separated from the œsophagus by a deep and distinct constriction; the cells of which the intestine is composed are closely packed with fine granules. The ventral gland, lying in the cardiac region, empties by means of a wide duct and sub-spherical ampulla, through the pore situated just behind the oblique nerve-ring. The lateral fields are one-fourth as wide as the body. The anterior half of the tail is conoid from the slightly depressed anus; thence to the barely swollen three-haired terminus it is cylindroid, with a width equal to that of the spicula. The tail bears numerous short hairs; caudal glands are present. A pre-anal ventral row of fifteen small gland-outlets occupies a distance one and one-fourth times as great as the length of the tail: four of them occur opposite the spicula, but the interval between each two successive outlets increases anteriorly. The hairs immediately in front of and behind the anus are better developed than those more remote, as is usually the case. The two equal, linear, very acute, arcuate spicula are widest in the middle, the proximal half being composed of four pieces of chitin; the proximæ can hardly be said to be cephalated. The two accessory pieces have spike-shaped processes extending backward parallel to the body axis, a distance equal to half the anal body-diameter. The ejaculatory duct has a length twice as great as the length of the tail. The junction of the two testicles is near the beginning of the middle third of the body.

Found in sand at a depth of four to five fathoms, Port Jackson, New South Wales, Australia.

COMESOMA SIMILIS, n.sp. $\frac{\cdot2\ \ 6\cdot2\ \ 10\cdot\ \ -48-^{30}\ \ 92\cdot}{\cdot8\ \ 2\cdot1\ \ 2\cdot5\ \ \ \ 3\cdot7\ \ \ \ 2\cdot}$ 3·3 mm. The cuticle of this species is very closely and finely punctate, and at

the same time transversely annulated, the annules being easily seen with moderate powers. The body bears short hairs; on the neck, not far behind the lateral organs, I observed two opposite rows of pectoral hairs, consisting each of four equidistant hairs so arranged that the whole row was two-thirds as long as the diameter of the adjacent part of the neck. These hairs remind one of the similar hairs occurring on the neck of *Anticoma*, and when taken in conjunction with other points of resemblance, suggest a not distant relationship between *Comesoma* and *Anticoma;* it should be observed that the pectoral hairs are here not of so pronounced a character as in *Anticoma*. The conoid neck becomes convex-conoid anteriorly and ends in a truncate head, bearing, opposite the base of the pharynx, a circle of ten spreading cephalic setæ arranged in the usual manner; these setæ on the whole are as long as the head is wide, but one of each of the four submedian pairs has only half that length. The lips are confluent and obscure, and bear no prominent papillæ; the pharynx is simple, cyathiform, two-fifths as wide as the head, as deep as wide, and contains at its base a small and weak dorsal tooth pointing inward and forward after the manner of the similar tooth found in the throat of *Chromadora*, *Cyatholaimus* and related genera. Of the two spiral lateral organs which occur just behind the pharynx and are two-thirds as wide as the neck, the right is a left-handed spiral of about two winds, while the left is a similar right-handed spiral. In its anterior part the œsophagus is one-half as wide as the neck; in the posterior part, however, it becomes two-thirds as wide as the neck, this part being almost entitled to be called a bulb. The lining of the œsophagus is distinctly to be seen when the organ is viewed in optical section. The intestine, which is four-fifths as wide as the body and is separated from the œsophagus by a shallow but distinct cardiac constriction, is composed of cells whose granules are so arranged as to give rise to an obscure tessellation. The rectum is as long as the anal body-diameter. The ventral gland is conspicuous, being situated behind the cardiac collum, and emptying, by means of a wide duct and large ellipsoidal ampulla one-third

as wide as the neck, through the excretory pore situated close behind the slightly oblique nerve-ring. The tail is conoid from the inconspicuous anus, but tapers more rapidly in the middle three-fifths than elsewhere. The terminus, where the caudal glands empty, is very slightly swollen and bears three short hairs. The vulva is neither raised nor depressed; the vagina is one-third as long as the body is wide. The eggs are a little longer than the body is wide and four-fifths as wide as long.

Male not seen.

This worm was found in sand near low-tide mark, Port Jackson, New South Wales, Australia.

COMESOMA JUBATA, n.sp. The thin, transparent cuticle of this striking species is very finely transversely striated and bears hairs throughout, though those on the body are very much smaller than those found on the neck. Most conspicuous among these latter are four submedian rows, of about twenty-five hairs each, situated opposite each other on the anterior half of the neck. These hairs, which are nearly as large as the cephalic setæ, do not grow perpendicularly upon the cuticle but at an angle, and each row is divided into two sets, those of one set sloping in one direction from the submedian line, while the alternate hairs belonging to the other set slope in the opposite direction. The conoid neck terminates anteriorly in a small truncate head, which bears near its anterior margin four submedian cephalic setæ, each somewhat longer than the head is wide. The inconspicuous lips are armed with two rows of small papillæ, each row consisting of six members; the outer row is half way between the cephalic setæ and the anterior border of the head, while the second is placed close round the mouth. Three-wind spiral lateral organs one-half as wide as the head occur close behind the lip-region, their anterior margins, in fact, being a little in front of the circlet of cephalic setæ; as usual, the right one is a left-handed spiral and the left a right-handed spiral. The worm is destitute of eyes. The small and simple conoid pharynx is in its widest part only one-third as wide as the head. The conoid œsophagus, at first only one-half as wide as the neck, becomes, in the posterior fifth,

two-thirds as wide; its lining is distinctly to be seen in optical section. The thick-walled intestine, which is separated from the œsophagus by a deep and distinct constriction, is two-thirds as wide as the body and terminates in a rectum shorter than the anal body-diameter. The ventral gland, situated close behind the cardiac region, empties through a pore opposite the ventral part of the oblique nerve-ring. The ampulla is large and ellipsoidal. The lateral fields are one-third as wide as the body.

The anterior half of the tail is convex-conoid from the depressed anus; thence it continues cylindrical and one-fourth as wide as at the anus, with occasional short hairs, to the barely expanded terminus, which is armed with three hairs and gives exit to the secretion of the caudal glands. The depressed vulva leads into a vagina one-half as wide as the body. The uteri often contain large pyriform spermatozoa two-fifths as long as the body is wide. The eggs are one-half to two-thirds as wide as the body and three times as long as they are wide. Each of the outstretched ovaries is about three times as long as the œsophagus.

$\frac{\cdot3\ \ 6.\ \ 10{\cdot}6\ \ M\ \ 91{\cdot}}{\cdot9\ \ 2{\cdot}2\ \ 2{\cdot}4\ \ 2{\cdot}9\ \ 2{\cdot}}$ 2·7 to 3·8 mm. The male tail is like that of the female, except that the anus is slightly elevated. The two equal, linear, acute, nearly uniformly arcuate spicula are somewhat narrower in the proximal third, where they are composed of three pieces of chitin, although the proximæ are not cephalated; the length of the spicula is twice as great as that of the anal body-diameter. The accessory pieces are parallel to the distal fifth of the spicula; thence they extend backward parallel to the lateral plane of the body. There seem to be two testicles. The inconspicuous pre-anal row of sixteen equidistant ventral gland outlets is as long as the tail.

This species is very common in sea-sand near low-tide mark, Port Jackson, New South Wales, Australia.

Spira, Bastian.

Spira similis, n.sp. $\frac{\cdot3\ \ 2{\cdot}8\ \ 5{\cdot}8\ \ M\ \ 93{\cdot}8}{\cdot8\ \ 1{\cdot}1\ \ 1{\cdot}4\ \ 1{\cdot}8\ \ 1{\cdot}5}$ 3·2 mm. This is a species very closely resembling *S. parasitifera*, Bast.; in fact it is not impos-

sible that it may be identical with it. However, the female has yet to be seen, and that sex may present differences greater than any I can find in the male. It will be observed that the spicula are in form and proportions different from those of *parasitifera*. The transversely striated cuticle bears slender hairs throughout. The conoid neck ends in a truncate head bearing four (?) submedian setæ. The lips are obscure. At the first glance the lateral organs would be supposed to be circular; closer observation shows them to be broken circles, the break occurring on the dorsal margin. These organs are one-third as wide as the head and are removed from the anterior extremity a distance equal to their own diameter; the central "fleck" is a small spiral. There are no eyes. The concave-conoid pharynx ends opposite the centres of the lateral organs, and bears at its base a tiny dorsal tooth. The œsophagus is cylindrical to the prolate cardiac bulb, the latter being five-sixths as wide as the corresponding part of the neck, while the tube leading to it is only two-fifths as wide as the neck. The lining of the œsophagus when seen in optical section appears as a distinct double line. The cardiac constriction is shallow but distinct. The intestine is at its beginning only one third as wide as the body, but soon doubles in size; the contents seem to consist almost entirely of greenish vegetable matter. The cardia is very small. The cells of the intestine contain loose granules having no visibly definite arrangement. The ventral excretory pore is situated just behind the oblique nerve-ring; the duct is narrow, the ampulla ellipsoidal and one-half as wide as the œsophagus. The tail is conoid to the acute conical terminus; caudal glands seem to be present. I saw no supplementary organs. Two sub-dorsal hairs occur somewhat behind the pieces accessory to the spicula. These latter are equal, linear, uniformly arcuate, widened in the proximal half and strongly cephalated, their length being equal to twice the anal body-diameter. The two accessory pieces are one-third as long as the spicula and obscurely sigmoid, on the whole appearing to be perpendicular to the ventral surface of the body. There appeared to be two testicles extending in opposite directions, but I was not certain about that.

Found in sand, near low-tide mark, Port Jackson, New South Wales, Australia.

Terschellingia, De Man.

Terschillingia exilis, n.sp. $\frac{\cdot0\ \ 3{\cdot}3\ \ 5{\cdot}5\ \ -16-\ \ 50\ \ 82\cdot}{\cdot9\ \ 1{\cdot}5\ \ 1{\cdot}5\ \ 1{\cdot}6\ \ 1{\cdot}2}$ 2·90 mm.

The cuticle of this slender species, of which I have seen only the female, is marked with transverse striæ resolvable with high powers into rows of dots. The hairs on the body are very small. The short cylindroid neck terminates anteriorly in a rounded head bearing on its front four submedian setæ, each nearly as long as the diameter of the neck, and, a little farther back, two somewhat shorter sub-cephalic setæ. Lips and papillæ of the usual form are lacking. The distance from the anterior extremity to the front margin of the circular lateral organs is about equal to the width of one of these organs, or to half the width of the head. There are no eyes. About the nature of the pharynx I am uncertain. The casual observer would deny its existence altogether. If, however, one examines the lumen of what appears

conoid from the depressed anus to the barely swollen apiculate and naked terminus, which gives exit to the secretion of the caudal glands. The vulva is inconspicuous. The eggs are four-fifths as wide as the body and twice as long as wide.

Found in sand, near low-tide mark, Port Jackson, New South Wales, Australia.

SPHAEROLAIMUS, Bastian.

SPHAEROLAIMUS HIRTICOLLIS, n.sp. $\frac{1{\cdot}8 \;?\; 17{\cdot} \quad -55{\cdot}^{38} \quad 83{\cdot}}{2{\cdot}5 \;?\; 4{\cdot}2 \quad 4{\cdot}6 \quad 3{\cdot}2}$ 1·71 mm.

The transparent cuticle is traversed by transverse striæ 1·2μ apart, composed of dots resolvable only with high powers; these dots have also a tendency to an arrangement in longitudinal lines. The anterior half of the neck bears numerous slender hairs three-fourths as long as the body of the worm is wide; the remainder of the body nevertheless bears only short and very inconspicuous hairs. The cylindroid neck becomes convex-conoid anteriorly and ends in a sub-truncate head bearing opposite the middle of the capacious pharynx a circlet of twelve rather uniform and comparatively stout bristles having a length half as great as the long cervical hairs and being arranged in pairs, one pair occurring on each median and submedian line. The lips, probably six in number, bear six setose papillæ, one on each lip. The structure of the lips seems to be similar to that found in *Oncholaimus*, where each lip approximates in shape to a spherical triangle, the six together forming a kind of dome over the pharynx; needless to say they can be separated wide apart and used in seizing hold of food. The lateral organs are situated opposite the posterior part of the pharynx; they are of the sort found on all species of *Monhystera*, but are, I think, instead of being exactly circular, somewhat longest in the transverse direction. Their longest diameter is not far from one-fourth as long as the width of the head. There are no eyes. The triquetrous pharynx is one-half to two-fifths as wide as the head and about twice as deep as wide; anteriorly its walls are transparent, posteriorly they are less so, the change occurring suddenly near the middle. The pharynx contains no teeth or other biting arma-

ture. The cylindroid œsophagus is two-thirds as wide as the neck and its distinct chitinous lining appears crenate, when seen in optical section. The cells of the thick-walled intestine, which is three-fifths as wide as the body and is separated from the œsophagus by a shallow but distinct constriction, are closely packed with granules. I learned nothing concerning the nature of the ventral gland or the lateral fields. The anterior half of the tail bears short hairs here and there, and is conoid from the inconspicuous anus; thence to the barely swollen terminus, which bears two hairs, it is cylindroid and one-fourth as wide as at the anus. The eggs are two-thirds as wide as the body and twice as long as wide.

$\frac{2{\cdot}1}{2{\cdot}2}$ $\frac{'}{3{\cdot}4}$ $\frac{20}{3{\cdot}0}$ $\frac{M}{3{\cdot}6}$ $\frac{=5'}{2{\cdot}4}$ 1·7 mm. The tail of the male is much like that of the female. The two equal setaceous spicula, two-thirds as long as the tail, are straight except near the distal extremity, being arranged through the greater part of their length parallel to the axis of the body; their proximæ are not cephalated. The two trough-shaped accessory pieces in which the spicula glide

head, and is armed with three teeth of which the left ventral submedian reaches to the lips, the others projecting but little into the pharynx and reaching only three-fourths the way to the lips. The œsophagus is at first only one-half as wide as the neck, but becomes in the posterior part two-thirds as wide as the neck; being very transparent its lining is distinctly to be seen. The intestine, which is two-thirds as wide as the body, is separated from the œsophagus by a shallow but distinct constriction; its cells contain granules so arranged as to give rise to an irregular tessellation. The rectum is a little longer than the anal body-diameter. The ventral gland empties through a narrow duct and an elongated ampulla; the pore is situated just behind the oblique nerve-ring. The lateral fields are one-fourth as wide as the body. The conoid tail tapers more rapidly in the anterior part, the posterior part being one-fifth as wide as the base of the tail. The caudal glands empty at the barely expanded terminus. The inconspicuous vulva leads into a vagina one third as long as the body is wide. The eggs are two-thirds as wide as the body and four times as long as wide. The reflexed parts of the ovaries extend three-fourths the way back to the vulva.

$\frac{1{\cdot}8 \quad 10{\cdot}6 \quad 17{\cdot} \quad M \quad 85{\cdot}}{{\cdot}8 \quad 2{\cdot} \quad 2{\cdot}1 \quad 2{\cdot}3 \quad 1{\cdot}6}$ 2·22 mm. The tail of the male resembles that of the female in form. The two equal, simple, elongated, straight and acute spicula when seen in profile appear to make an angle of forty-five degrees with the axis of the body; they are of uniform size throughout, being hardly at all thickened at the proximal ends. The length of these organs, which is readily made out on account of the general transparency of the body, is somewhat less than that of the anal body-diameter. There are traces of accessory pieces one-third as long as the spicula. I could discover no supplementary glands or papillæ.

This nematode is to be found in sea-sand near low-tide mark, Port Jackson, New South Wales, Australia.

Oxystoma, Bütschli.

Oxystoma pellucida, n.sp. $\frac{{\cdot}1 \quad 9{\cdot} \quad 22{\cdot} \quad 29^{30} \quad 94{\cdot}3}{{\cdot}3 \quad 1{\cdot}2 \quad 1{\cdot}6 \quad 1{\cdot}8 \quad 1{\cdot}}$ 2·54 mm. The glassy cuticle of this graceful species is not marked in any w

nor do any hairs grow on its surface, if we except those on the head. The neck is conoid to the truncate head, which bears opposite the base of the œsophagus a circlet of six short setæ. Some distance behind the cephalic setæ, namely, at one-third the distance from the anterior extremity to the lateral organs, occurs another row of four similar setæ, all submedian. Neither lips nor papillæ are to be seen round the mouth. The lateral organs, which are one-third as wide as the part of the neck on which they occur, are oval in shape, their longer axis being placed parallel to the axis of the body; the distance from the anterior border of the head to these organs is one-fifth as great as from the head to the oblique nerve-ring. From the lateral organs a structure is plainly seen to pass inward and backward. The worm is eyeless. Through the simple cup-shaped pharynx the food passes into an œsophagus which at first is only one-half as wide as the corresponding part of the neck, but which gradually expands until in the posterior part it is three-fourths as wide as the base of the neck. The lining of the œsophagus is apparently much corrugated. Notwithstanding the fact that the cardiac constriction is very shallow and inconspicuous, the beginning of the intestine is plainly to be seen because of its marked difference of colour. The cardia is shallow. The thickness of the cells of which the intestine is composed is one-fourth as great as the diameter of the intestine, and the cells are of such a size and shape that twelve of them

backward into a uterus ten times as long as the body is wide, and containing two segmenting eggs each four times as long as the body is wide and one-fifth as wide as long. In the uterus are granular spermatozoa of a spherical shape, and of such a size that eight of them placed side by side would reach across the body. The reflexed part of the ovary reached three-fourths the way back to the vulva and contained numerous developing ova arranged in single file.

This worm, of which I have seen only the female, was found in mud below low-tide mark, Port Jackson, New South Wales, Australia.

Plectus, Bastian.

P. parietinus, Bast., var. *australis*. $\frac{1{\cdot}5\ 10{\cdot}5\ 20{\cdot}\ {}'48^{\cdot33}\ 92{\cdot}}{1{\cdot}6\ 3{\cdot}7\ 4{\cdot}6\ 5{\cdot}6\ 2{\cdot}9}$ 1·5 mm. The transparent cuticle is transversely striated, there being about seven hundred striæ in all on the worm. The body wall is nearly one-fourth as thick as the worm itself. Very inconspicuous papilla-like setæ occur throughout the body. The neck contracts more rapidly anteriorly where it is convex-conoid, ending in a somewhat truncate head bearing six distinct sub-spherical lips, each bearing at least two very inconspicuous papillæ. The lateral organs are unclosed ovals about as wide as the cephalic setæ are long, placed opposite the middle of the pharyngeal cavity. The cephalic setæ are of equal size and are four in number, and are arranged one on each submedian line at the base of the lips; they grow at right angles to the cuticle and have a length about equal to the diameter of one of the lips. There are no eye-spots. The compound pharynx is composed of two parts, of which the first is that referred to in the formula (as 1·5); this is again duplex in structure, being wider in the anterior half than in the posterior. A slight stricture in the outer contour of the pharyngeal tube marks the beginning of the posterior part of the pharynx which contains what appears to be a narrowly fusiform cavity as long as the duplex cavity just mentioned, the entire pharynx therefore occupying nearly one-fourth of the length of the neck. The cylindroid œsophagus, scarcely one-third as wide as the neck, ends

posteriorly in a prolate bulb more than half as wide as the base of the neck and containing a distinct chitinous valvular structure. A distinct but not deep constriction separates the œsophagus from the intestine, which is granular and greenish in colour and more than half as wide as the body. The cardia is more than half as long as the bulb. The rectum, which is equal in length to the anal body-diameter, is suddenly contracted at the middle; the pyloric collum is distinct. The narrow and tortuous chitinous duct of the ventral gland ends in a ventral pore just behind the nerve-ring. The distance between the wings of the cuticle is equal to one-third the width of the body. The conoid tail ends in a blunt apiculate terminus, the outlet for the secretion of the three caudal glands whose three ducts are plainly visible in the posterior part of the tail. The inconspicuous vulva leads to a broadly conical vagina one-third as long as the body is wide. The thin-shelled eggs are half as wide as the body and one and one-half times as long as wide. The ovaries reach three-fourths the distance back to the vulva. The eggs are deposited before segmentation begins.

On culms of grass and among the blanched parts of celery, Sydney, New South Wales, Australia; abundant.

P. AGILIOR, n.sp. $\frac{1\cdot5}{1\cdot4}$ $\frac{11\cdot8}{3\cdot}$ $\frac{21\cdot5}{3\cdot4}$ $\frac{'49}{3\cdot6}$ $\frac{'25}{}$ $\frac{89\cdot6}{1\cdot8}$ 1·14 mm. Like the preceding species, but narrower, and having the anterior chamber of the pharynx so divided that its narrower posterior part is twice

are arranged also in longitudinal rows. Conspicuous among the dots are two longitudinal rows of circles arranged on either side of each of the lateral lines at a distance apart equal to one-third the width of the body. The neck becomes convex-conoid in front, and ends in a truncate head which bears near its anterior margin ten setæ one-half as long as the head is wide, arranged in the usual manner, the submedian pairs being of somewhat unequal size. The anterior part of the pharynx, one-half as deep as the head is wide and one-half as wide as deep, is cyathiform, its sides presenting twelve jointed ribs; at the base of this part of the pharynx occurs a small and pointed dorsal tooth behind which the pharynx narrows gradually, ceasing at 30μ from the anterior extremity. The lateral organs are rather obscure spirals of five winds situated opposite the middle of the pharynx, the right being a left-handed spiral and the left a right-handed spiral, as usual; in size they are one-third to one-half as wide as the head. There are no eyes. The simple œsophagus, though at first only one-third, becomes finally one-half, as wide as the neck; there is no bulb. The cardiac collum is shallow but distinct, and the cardiac region rather transparent. The thick-walled intestine is one-half as wide as the body. The ventral excretory pore is situated just behind the nerve-ring. The lateral fields are one-third as wide as the body. The anterior half of the tail is slightly convex-conoid; thence it is setaceous to the barely swollen terminus, which gives exit to the secretion of the caudal gland. The anal region is slightly elevated. The two equal, linear spicula are of uniform size and are parallel to the lateral plane of the body in their proximal halves; thence they are arcuate. Their proximæ are prominently cephalated by a sudden flat expansion. The two accessory pieces are parallel to the spicula and are nearly as long as they; but are, however, not cephalated and are the wider distally. The blind end of the testicle is as far behind the cardia as the latter is behind the lips. No supplementary organs were seen.

It is possible that this is a member of an hitherto unrecognized genus, closely related to *Cyatholaimus*, &c.

The worm inhabits sea-sand near low-tide mark, Port Jackson, New South Wales, Australia.

CYATHOLAIMUS EXILIS, n.sp. $\frac{\cdot7\ \ 3{\cdot}9\ \ 9{\cdot}7\ \ {}^{\cdot}60{-}^{20}\ \ 90{\cdot}}{1{\cdot}6\ \ 2{\cdot}\ \ 2{\cdot}\ \ \ 2\ 7\ \ \ 1\ 9}$ 2·44 mm. The cuticle of this species is traversed by transverse striæ easily resolvable with medium powers into rows of dots everywhere alike, —not differing on the lateral lines from those elsewhere, as is often the case. The body is destitute of hairs. The cylindroid neck ends in a truncate head bearing ten sub-equal cephalic setæ one-fourth as long as the head is wide and arranged in the usual manner. Each of the six lips bears two setose papillæ. The spiral lateral organs, situated opposite the base of the pharynx, are one-half as wide as the head. There are no eye-spots. The twelve-ribbed cyathiform pharynx is in its widest part two-thirds as wide as the head and bears a plainly visible pointed dorsal tooth somewhat behind the middle. The conoid œsophagus is anteriorly one-half and posteriorly two-thirds as wide as the corresponding part of the neck; its lining is not very distinctly to be seen. The intestine, which is separated from the œsophagus by a distinct cardiac constriction, is one-half as wide as the body and tessellated with coarse granules The length of the rectum equals that of the anal body-diameter. The unicellular ventral gland lies behind the cardiac region and empties through a ventral pore situated near the nerve-ring; the ampulla is small and ellipsoidal. The

marked by transverse striæ, 2·2μ apart, composed of rows of bead-like markings easily resolvable with medium powers. In addition, two longitudinal rows of circles occur in the lateral regions separated by a space equal to one-fourth the width of the body. Short hairs occur throughout the length of the body. The conoid neck terminates in a squarely truncate head. Opposite the base of the pharynx a circlet of ten cephalic setæ, one-half as long as the head is wide, are arranged in the usual manner. Each of the six lips bears a seta one-half as long as the cephalic setæ. Each of the lateral organs is a spiral of four winds, that on the right being a left-handed spiral and that on the left being a right handed spiral; they are situated opposite the base of the pharynx and are one-third as wide as the head. Backward from the strongly twelve-ribbed cyathiform pharynx, which is one-half as wide as the head and one-half as deep as wide, extend three indistinct chitinous structures which, doubtless, represent infoldings in the upper part of the œsophagus; if so then it is highly probable that the pharynx should be regarded as extending back as far as the posterior part of these structures. I wished much to ascertain what movements the back part of the pharynx was capable of, but could not satisfy myself. It seems to me likely that Dr. De Man's *Halichoanolaimus* gives some idea of the movements possible in *Cyatholaimus*, of which *Halichoanolaimus* is, so to speak, an exaggeration. The simple conoid œsophagus, at first only one-half as wide as the neck, enlarges gradually to two-thirds as wide; it has a distinct chitinous lining and is separated from the intestine by a distinct but rather shallow constriction. The short cardia leads to an intestine three-fourths as wide as the body, composed of cells containing loosely stationed granules having a tendency to a tessellated arrangement. The rectum has a length, in the female, equal to the anal body-diameter. The ventral gland, situated just behind the cardiac region, empties, by means of a narrow duct and a pyriform ampulla one-fourth as wide as the neck, through the ventral pore situated just behind the nerve-ring. The anterior fifth of the tail is conoid, tapering much; thence the tail is setaceous, being one-

eighth as wide as at the anus, to the naked and swollen terminus which gives exit to the secretions of the caudal glands. The rather inconspicuous vulva leads into a vagina one-third as long as the body is wide. The eggs are two-thirds as wide as long, and as long as the body is wide; they seem to remain unsegmented while in the uterus. The reflexed part of the ovaries reach three-fourths the way back to the vulva.

This worm inhabits sea-sand, near low-tide mark, Port Jackson, New South Wales, Australia,

CYATHOLAIMUS MINOR, n.sp. The female remains unknown. $\frac{\cdot 9 \quad 6{\cdot}4 \quad 16{\cdot} \quad M \quad 87{\cdot}}{1{\cdot}6 \quad 3{\cdot}2 \quad 3{\cdot}4 \quad 3{\cdot}5 \quad 2{\cdot}8}$ 1·22 mm. The transparent cuticle is crenate when seen in optical section, this appearance arising from the presence of transverse striæ, 2·6μ apart, resolvable with medium powers into rows of dots. On the lateral fields these dots are arranged longitudinally in four rows occupying a space one-fourth as wide as the body. Circular markings, of unknown significance, very considerably larger than the dots, also occur: these are arranged on the sides of the body right up to the head, in some parts as if in three irregular rows, in other parts as if in two, one of them irregularly double. I saw no hairs on the body. The neck is cylindroid posteriorly, but anteriorly it becomes convex-conoid and ends in a sub-truncate head, set off by a slight constriction. The ten sub equal spreading cephalic setæ are one-half as long as the head is wide, and are arranged in the usual

neck; its lining is distinctly to be seen. The intestine, which is separated from the œsophagus by a shallow but distinct constriction is one-half as wide as the body and is composed of cells containing coarse granules so arranged as to give rise to an obscure tessellation. The ventral gland is situated behind the cardiac constriction and empties through a ventral pore opposite the nerve-ring. The latter encircles the œsophagus squarely. The anterior half of the glabrous tail is suddenly conoid from the anus; thence to the barely swollen long-apiculate terminus it is cylindroid and one-eighth as wide as at the anus. Caudal glands are present as usual. A pre-anal ventral row of six small equidistant supplementary organs occupy a space twice as long as the length of the spicula. The two equal, linear, arcuate spicula are one and one-half times as long as the anal body-diameter; their proximal ends are not cephalated, but they are bent towards the ventral side of the body. The two equal narrow accessory pieces are three-fourths as long as the spicula, which they envelope at their apices.

Found in sand at the bottom of Port Jackson, New South Wales, Australia, at four to six fathoms depth.

CYATHOLAIMUS BREVICOLLIS, n.sp. I have seen but a single male of this handsome little species. The proportions of the head and neck remind one strongly of *Spilophora*, but the presence of spiral lateral organs on the head, and of a ventral row of pre-anal accessory organs in the male, make it a species of doubtful affinity. My measurements gave the formula $\frac{\cdot3}{1\cdot4}\ \frac{6\cdot3}{3\cdot4}\ \frac{9\cdot7}{3\cdot5}\ \frac{M}{4\cdot}\ \frac{83\cdot}{2\cdot8}$ 1·38 mm. The transparent skin presents very inconspicuous hairs, if any, and is traversed by about six hundred transverse striæ, two micromillimètres apart, and consisting of rows of circular dots which become larger as the lateral fields are approached; there they arrange themselves also in three longitudinal rows which become indefinite near the head and of which the middle one is exactly lateral. Just outside the three rows of dots I observed two chitinous wings, one on either side. The space occupied by the three lateral rows of dots is one-fourth as wide as the body of the worm. The neck of the worm is convex-conoid and terminates anteriorly

in a slightly swollen and transparent head, which is rounded in front and which bears several inconspicuous organs, among which I notice particularly spiral lateral organs one-half as wide as the head, situated near the anterior margin of the head, and at least four papilla-like cephalic setæ, and finally three obscure lips each apparently with four obscure papillæ. The right lateral organ is a left-handed spiral of two winds and the left organ is a similar right-handed spiral. There are no eyes. The pharynx is minute, cyathiform, obscurely ribbed, and contains a minute dorsal tooth situated near its base. The œsophagus is about one-third as wide as the neck, but expands in the posterior fifth to form an ellipsoidal bulb, not double as in *Spilophora*, but with a well developed chitinous lining. The cardiac constriction is deep and distinct. The intestine, which is two-thirds as wide as the body, is loosely granular. The ventral gland is situated behind the cardiac region, and empties its excretion by means of a wide duct and elongated ellipsoidal ampulla one-third as wide as the neck, through a pore situated just behind the oblique nerve-ring. The anterior half of the tail is conoid; thence it continues, cylindroid and one-eighth as wide as at the anus, to the elongated barely swollen sub-apiculate terminus. The two equal, arcuate, elongated spicula are widest in the middle and are not much curved; the full length of the spicula is twice as great as the anal body-diameter, and their proximal extremities are narrowed and

It is manifestly closely related to *H. robustus*. The tail is short and tapers suddenly from near the anus, soon becoming setaceous to the naked terminus which is not expanded, but has a peculiar cylindrical outlet for the secretion of the caudal glands. The cuticle is finely transversely striated with rows of fine dots, resolvable with moderate powers. Near the lateral lines the dots are larger, and are arranged also in longitudinal rows. On either side of the lateral line, separated by a distance equal to one-eighth of the width of the body, two such longitudinal rows are found, and clustered together between them three other more irregular rows. This longitudinal arrangement of the lateral dots ceases near the head and near the tail. The cylindroid neck terminates anteriorly in a squarely truncate head which bears on its margin ten papilla-like setæ, the only hairs to be seen on the whole body. Each of the six conoid transparent lips bears a papilla. The spiral lateral organs, consisting of three winds, are one-fourth as wide as the head and are situated opposite the middle of the pharynx; the right is a left-handed spiral and the left a right-handed spiral. There are no eyes. The pharynx is two-parted: the anterior cyathiform twelve-ribbed part is one-half as wide as the head and nearly as deep as wide; the posterior triquetrous part is as long as the anterior part, but only about one-half as wide, each of its angles being the location of a conspicuous longitudinal chitinous structure whose function is to furnish attachment for one end of the powerful pharyngeal muscles. The interior surface of the pharynx is supplied at its narrowest part, namely, between the two chambers of which it is composed, with numerous chitinous teeth whose function is, as Dr. de Man has suggested, doubtless masticatory. I noticed also a decided transverse striation, or rather file-like roughness, between the longitudinal ribs of the anterior part of the pharynx, designed, doubtless, to give a better grip on the food. It is noticeable that these ribs of the anterior chamber are the summits of ridges and are not conspicuously jointed as in *Cyatholaimus* and many species of *Chromadora*. The cylindroid œsophagus is slightly expanded both anteriorly and posteriorly, and measures

about two-thirds as wide as the neck. Its lining is conspicuously crenate in optical section. The intestine, which is separated from the œsophagus by a deep and narrow cardiac constriction, is three-fourths as wide as the body, and contains in its cells small granules with a tendency to a tessellated arrangement. The post-cardiac ventral gland empties through a pore just behind the nerve-ring; the sub-spherical ampulla is one-fourth as wide as the neck and often presses the skin outward in the region of the duct so as to form a conspicuous ventral elevation. The lateral fields are nearly one-fourth as wide as the body. The nerve-ring encircles the œsophagus squarely.

The young stages of this worm were found in sea-sand near low-tide mark, Port Jackson, New South Wales, Australia.

Graphonema, gen.nov.

Graphonema vulgaris, n.sp. I have seen numerous specimens of this handsome and very common worm. It frequents algæ and sea-sand along the coast of New South Wales and Victoria. Like *Graphonema pachyderma*, another species to be described later on, and to which it is closely related, it much resembles the species of *Chromadora*, but lacks the ventral row of preanal male accessory organs and possesses a simple œsophagus without a cardiac bulb. Female formula—

·5 7· 13· 47·^{30} 89· 1·6 to 1·8 mm. The middle diameter is very

opposite the base of the same tooth are so far forward and so small that they are easily confounded with the setose papillæ distributed on the lips. These papillæ are numerous, six larger being found on the front of the lips, one on each lip, and about eighteen others smaller, being found nearer the oral orifice. The lateral organs seem to be represented by what appears in the profile view to be a transverse lateral ridge opposite the subcephalic setæ. There are no eyes. The simple cyathiform twelve-ribbed pharynx is 8μ deep and contains, 3μ from its anterior border, a minute dorsal tooth. The ribs of the pharynx are jointed. Anteriorly the œsophagus is only one-third as wide as the neck in its anterior half, but behind the nerve-ring it gradually expands until it finally becomes two-thirds as wide as the base of the neck. The cardiac constriction is distinct and rather broad. The thin-walled intestine, at first narrow, becomes gradually three-fourths as wide as the body. The rectum in the female is equal in length to the anal body-diameter. The elongated ventral gland is situated behind the cardiac region, and empties its excretion by means of a duct and an ellipsoidal ampulla one-third as wide as the neck, through a ventral pore situated just behind the nerve-ring. The tail is conoid from the inconspicuous anus; the conoid terminus is one-third as wide as the base of the tail. Caudal glands are present. The elevated vulva leads to uteri, never containing more than three or four eggs each; these are unsegmented and three-fourths as wide as the body, and two-thirds as long as wide. The reflexed parts of the ovaries reach three-fourths the way back to the vulva. $\frac{4}{1{\cdot}1}\ \frac{7{\cdot}}{2{\cdot}1}\ \frac{12{\cdot}5}{2{\cdot}2}\ \frac{-M}{3{\cdot}3}\ \frac{88{\cdot}}{2{\cdot}2}$ 1·6 to 1·8 mm. The male tail is precisely like that of the female,—perhaps a little more arcuate. The two equal, linear, arcuate spicula appear to be of uniform size throughout, and are twice as long as the anal body-diameter. The two simple accessory pieces are one-half as long as the spicula and are arranged parallel to them. I saw no accessory organs either pre- or post-anal.

This worm is very common on Australian coasts, among algæ and in sand.

NOTES AND EXHIBITS.

Mr. Brazier exhibited a large, partly broken specimen of a flattened *Haliotis* from Victoria, certainly quite distinct from any of the known Australian species. Also *Placostylus Payensis*, Kobelt, var. *Gayettensis*, Crosse, having the lip and the interior of the aperture all white, from Gayetta, New Caledonia.

Mr. D. G. Stead exhibited specimens of a Crustacean, *Philyra pisum*, de Haan, from Japan, one of them showing a curious abnormal prong-like growth on the dactylos of the left cheliped.

Mr. Froggatt exhibited specimens of the galls described in his paper, with illustrations. Also a series of branches of *Acacia longifolia* covered with an indigenous scale, *Planchonia venturosa*, Mask., showing at different stages the effects produced by the parasite, and the remarkable manner in which the branches eventually become corrugated. The species is peculiar to the Acacias, and has been recorded from the neighbourhood of Sydney and South Australia. The specimens exhibited were collected at Gosford and forwarded to the Department of Agriculture by Mr. C. L. Tange. Also a small collection of Frog-Hoppers (*Membracidæ*) to illustrate a paper recently communicated to the Society by Dr. Goding.

WEDNESDAY, SEPTEMBER 28TH, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, September 28th, 1898.

Professor J. T. Wilson, M.B., President, in the Chair.

DONATIONS.

Geological Survey of India—General Report for the Period from 1st January, 1897, to 1st April, 1898. *From the Director.*

Regia Societas Scientiarum Upsaliensis—Nova Acta. Series Tertia. Vol. xvii. Fasc. ii. (1898). *From the Society.*

Societas Scientiarum Fennica, Helsingfors—Acta. Tomi xxii.-xxiii. (1897): Oeversigt. Vol. xxxix. (1896-97). *From the Society.*

Australasian Institute of Mining Engineers, Melbourne—Transactions. Vol. v. (1898). *From the Institute.*

American Naturalist. Vol. xxxii. Nos. 378-379 (June-July, 1898). *From the Editor.*

American Museum of Natural History, N.Y.—Bulletin. Vol. x. Article xiv. (pp. 249-298: July, 1898). *From the Director.*

Royal Society, London—Proceedings. Vol. lxiii. Nos. 400-401 (July, 1898); Vol. lxiv. No. 402 (August, 1898). *From the Society.*

Société Royale Linnéenne de Bruxelles—Bulletin. 23me Année. Nos. 8-9 (Juin-Juillet, 1898). *From the Society.*

Perak Government Gazette, Vol. xi. Nos. 21-22 (July-Aug. 1898). *From the Government Secretary.*

Department of Agriculture, Melbourne—Guides to Growers. Nos. 37 41 (April-June, 1898): Report on Fairy Rings, and the Fairy Ring Puff-Ball. By D McAlpine (May, 1898). *From the Government Vegetable Pathologist.*

Pamphlet—Descriptive Catalogue of the Coleoptera of South Africa. Part iv. Family *Pselaphidæ*. By A. Raffray, Memb. Ent. Soc. of France, &c. *From the Author.*

Department of Mines and Agriculture, Sydney—Mineral Resources. No. 3. Notes on Gold Dredging. By. J. B. Jaquet, A.R.S.M., F.G.S. (1898): A Manual of the Grasses of New South Wales. By J. H. Maiden, Government Botanist (1898). *From the Hon. the Minister for Mines and Agriculture.*

Department of Agriculture, Brisbane—Queensland Agricultural Journal. Vol. iii. Part 3 (Sept., 1898). *From the Secretary for Agriculture.*

Department of Agriculture, Perth, W.A.—Producers' Gazette and Settlers' Record. Vol v. Part 6 (June, 1898). *From the Secretary.*

The Surveyor, Sydney. Vol. xi. No. 9 (September, 1898). *From the Editor.*

Zoologischer Anzeiger. xxi. Band. No. 565 (August, 1898). *From the Editor.*

Public Library, Museums, &c., Melbourne—Report of the Trustees for the Year 1897. *From the Trustees.*

Department of Lands and Survey, Wellington, N.Z.—Report for the Year 1897-98. By S. Percy Smith, F.R.G.S., Surveyor-General. *From H. Farquhar, Esqr., Wellington.*

Linnean Society, London—Journal, *Botany.* Vol. xxxiii. Nos. 229-233; *Zoology.* Vol. xxvi. Nos. 168-171 (Nov., 1897-July, 1898): Proceedings, Nov., 1896-June, 1897: Transactions. Second Series. *Botany,* Vol. v. Parts 7-8; *Zoology.* Vol. vii. Part 4 (1897-98): List of Fellows, 1897-98. *From the Society.*

Zoological Society, London—Proceedings, 1898. Part 2 (Aug.): Transactions. Vol. xiv. Part 7: List of Fellows, 1898. *From the Society.*

Geological Society, London—Quarterly Journal. Vol. liv. Part 3 (No. 215; Aug., 1898). *From the Society.*

Société Hollandaise des Sciences à Harlem—Archives Néerlandaises. Sér. 2me. Tome ii. 1re Liv. (1898). *From the Society.*

Royal Microscopical Society, London—Journal, 1898. Part 4 (August). *From the Society.*

Johns Hopkins University, Baltimore—Hospital Bulletin. Nos. 88-89 (July-August, 1898). *From the University.*

Museum of Comparative Zoology, Harvard College, Cambridge—Bulletin. Vol. xxxii. No. 7 (Aug., 1898). *From the Director.*

Australian Museum, Sydney—Report of the Trustees for the Year 1897. *From the Trustees.*

Royal Society of Tasmania, Hobart—Abstract of Proceedings, May-August, 1898. *From the Society.*

Australasian Journal of Pharmacy, Melbourne. Vol. xiii. No. 153 (August, 1898). *From the Editor.*

ON THE WHITE ASH OF SOUTHERN NEW SOUTH WALES.

By Henry Deane, M.A., F.L.S., and J. H. Maiden, F.L.S.

Eucalyptus fraxinoides, sp.n.

(Plate xix.)

A tall tree.

Bark.—Belongs to the smooth-barked group. Outer layer falling off in ribbons; the bark blotched, reminding one somewhat of a Spotted Gum (*E. maculata*) as regards its blotches, and *E. viminalis* (Ribbon Gum) as regards the stripping of the outer bark.

Timber.—Pale coloured, light in weight and colour, fissile. Makes handsome bed-room furniture, and may be substituted for American Ash. Is used for snow-shoes in the Kiandra district. It is used in the Bombala district for lining instead of pine; also for panels and sash-work, as well as casks and butter kegs. Because of its resemblance to American Ash it goes under the name of White Ash; it also goes under the name of Mountain Ash, a name which, however, should be reserved for *E. Sieberiana*.

Fruit.—Shining, nearly globular; usually $\frac{7}{16}$ in. in diameter or a little less; urceolate in young fruit, the neck being almost lost in the mature fruit. The rim sharp. The valves usually five and very depressed.

Range.—On high mountain ranges of the extreme southern part of New South Wales. Herbarium specimes collected by W. Bäuerlen and the authors on Tantawanglo Mountain (3,000 feet), near Cathcart.

Affinity.—The affinity of this species is closest with *E. stricta*. It differs conspicuously from the latter in being a large tree, in the shape of the fruits, and in the venation of the leaves.

The fruits are sometimes not very dissimilar in shape to those of *E. maculata* and the small form of *E. corymbosa*, but the White Ash has no real affinity with either species, as it belongs to a different group entirely.

REFERENCE TO PLATE.

E. fraxinoides.

Fig. 1.—Young twig, bearing buds.
Fig. 2.—Mature leaf, showing venation.
Fig. 3.—Portion of young branch (slightly enlarged), showing angular stem.
Fig. 4.—Portion of young branch, more mature than Fig. 3, showing nearly terete stem.
Fig. 5.—Portion of leaf, showing twisted petiole.
Fig. 6.—Portion of flower-stalklet (enlarged).
Figs. 7-8.—Fruit.
Fig. 9.—Longitudinal } section of fruit.
Fig. 10.—Transverse }

ON TWO NEW SPECIES OF EUCALYPTUS.

By R. T. Baker, F.L.S., Curator, Technological Museum, Sydney.

(Plates x.-xi.)

Eucalyptus lævopinea, sp.nov.

"Silver-Top Stringybark."

A very tall tree in favourable situations. **Bark fibrous but** brittle, a feature that distinguishes it from that of **"Red Stringy-**bark," *E. macrorhyncha*, F.v.M., and **"White Stringybark,"** *E. eugenioides*, Sieb.; ultimate branches smooth. **Young leaves** alternate or scarcely opposite, broad at the base **but not cordate,** acuminate, about 3 inches long, the **intramarginal vein removed** from the edge, the lateral ones very distinct **on the under side,** scarcely showing on the upper surface. **Mature leaves varying** in size and shape, mostly very oblique, of a **dark green colour and** shining on both sides, lanceolate, falcate, **acuminate, the intra-**marginal vein removed from the edge, lateral **veins fairly distinct.** Petiole varying from ½ to 1 inch. Umbels axillary bearing about

(Blackbutt), and no doubt of equal excellence. It is durable in the ground, and free from gum-veins as a rule. Suitable for bridge-decking, wood-blocking, posts, rails, and general building purposes requiring a hard durable timber. In the case of "Red" and "White" Stringybark, the bark soon becomes detached after the timber is felled, but in this species the bark remains attached till the timber decays.

Kino.—The exudation belongs to the ruby group, consisting principally of a tannic acid and water. Contains neither gum like the kinos of the "Ironbarks," nor eudesmin or aromadendrin like the "Boxes." In constitution it is practically identical with that of *E. dextropinea*, described below.

Oil—A deep reddish colour, and it could not be distinguished from that of *E. dextropinea* except by chemical analysis. The leaves gave a yield of 0·66 per cent, and it consists very largely of lævo-rotatory pinene, chemically identical with the lævo-rotatory pinene obtained from trees of the Natural Order Coniferæ.

For the chemistry of this pinene see paper by my colleague, Mr. H. G. Smith, Proc. Roy. Soc. N.S.W., Oct., 1898.

Hab.—Nullo Mountain, Rylstone (J. Dawson), Never Never Mountain, Rylstone (R.T.B.), Gulf Road, Rylstone (R.T.B.)

This tree has always been regarded by local residents of the Rylstone district as quite distinct from any of the other "Stringybark" trees in the locality, owing to its peculiar bark and tough wood, and the glinting of the leaves in the sun, making them appear glaucous, and hence its vernacular name of "Silver-Top Stringybark." When seen growing in its native habitat it somewhat resembles *E. macrorhyncha*, F.v.M., and the mature fruits with the domed rim and well exserted valves might easily lead one to diagnose it as that species, but it differs therefrom in its hard durable timber, and also from it and cognate species by its characteristic bark, as well as in its hemispherical operculum, terete calyx tube, in its oblique leaves, and the physical constituents of its leaves and oil. Except for its domed fruits there is little to connect it botanically with *E. macrorhyncha*, F.v.M.,

from the leaves of which is extracted (1) the dye *myrticolorin*; (2) an oil, very rich in the new solid camphor or stearoptene *eudesmol*, and also *cineol*. These bodies are entirely absent from the leaves of this particular Eucalypt, and the oil is almost entirely composed of lævo-rotatory *pinene*.

The presence of pinene of course allies it with the other species described in this paper, whilst the optical characters remove it from that species. It differs from *E. capitellata* and *E. eugenioides* in the shape of its fruits, its bark, buds, and leaves, and the chemical constituents of its oil, but yet it is a "Stringybark," and the timber shows affinities with that group of Eucalypts, while the hemispherical base and size of the fruits are not unlike those of *E. capitellata*. In botanical sequence it may be placed after *E. capitellata*.

It is distinguishable from *E. obliqua* by its fruits and timber as well as its oil, but resembles that species somewhat in the shape of its leaves and buds.

It differs from *E dextropinea* of this paper in its fruits never having a countersunk rim, the superior quality of its timber, and the presence of a dextro-rotatory pinene in its essential oil. The leaves and buds of the two are identical.

The oblique leaves and immature fruits led me at one time to consider this species as *E. obliqua*, L'Hér., and I so recorded it (Proc. Linn. Soc. N. S. Wales, Vol x. 2nd Series, 1896).

the above species, being composed almost entirely of lævo-rotatory pinene.

Hab.—Barber's Creek (H. Rumsey).

EUCALYPTUS DEXTROPINEA, sp.nov.

"Messmate or Stringybark."

A tree attaining a height of from 60 to 100 feet or higher, and a diameter up to 5 feet. Bark dark or black on the outside, fibrous and longer in the fibre than that of the other species. Branches smooth for a considerable distance down, but this feature varies. Leaves almost identical with those of *E. lævopinea* of this paper, and resembling also those of *E. obliqua*, L'Hér., and *E. Muelleriana*, A.E H. Young leaves broad, rounded at the base, and very acuminate, opposite or nearly so, on a short petiole, the venation well defined, the intramarginal vein being much removed from the edge. Mature leaves lanceolate, falcate, acuminate, often very oblique, shining on both sides, rather thick, the intramarginal vein removed from the edge. Umbels axillary with about 8 flowers, peduncle flattened, operculum hemispherical, shortly acuminate. Calyx tube obconical, stalklet 4-6 lines long. Buds longer and larger than those of *E. lævopinea*, sp.nov.

Anthers reniform, connected above by a prominent connective, valves opening by longitudinal slits. Ovary flat-roofed.

Fruits 4 to 6 lines in diameter, hemispherical, truncate to rounded, occasionally domed, rarely countersunk, valves slightly exserted.

Hab.—Monga, on granite formation, but in soil that is fairly rich (W. Bäuerlen); Barber's Creek, mostly in the gullies (H. Rumsey).

It is allied in some of its characters to *E. obliqua*, L'Hér., viz.: the shape of the mature leaves, venation, buds, and in one particular form of fruit which has a contracted orifice and countersunk rim, but their sucker leaves are quite distinct, and the fruits are mostly hemispherical and usually with a thickened convex rim The individual fruit figured by Baron von Mueller in his plate of *E.*

obliqua in the *Eucalyptographia*, much resembles the fruit of this species. The timber, bark, and constituents of the oils of the two species are quite distinct, but herbarium specimens of them might easily be considered as belonging to one species.

The form of fruit referred to above is common also to *E. pilularis*, *E. stricta*, *E. Muelleriana*, *E. piperita*, but its other specific characters are too marked for it to be ranked with any of these.

It differs from *E. macrorhyncha* and *E. capitellata* in the nature of its timber, its fruits, bark, bud, and oil. The leaves do not contain any *myrticolorin*.

In bears in some respects alliance to *E. lævopinea*, but the bark is more fibrous and persistent, the timber is inferior, the fruits never so distinctly domed in the rim, and the valves much less prominent.

E. Muelleriana has a much superior timber and a very different bark to *E. dextropinea*. The leaves of the former are shining only on one side, and its fruits and buds are distinctly different.

It differs from *E. lævopinea* in the shape of its fruits, its inferior timber and nature of its bark, and the chemical composition of its oil. The buds and leaves are very similar, in fact, are identical with several other species, and like the venation, no specific difference can be based on these parts of a Eucalypt. As the investigations of cognate species are not yet complete its

the same as the dextro-rotatory pinene obtained from the Coniferæ.

For the chemistry of this pinene, see paper by my colleague, Mr. H. G. Smith, F.C.S., Proc. Roy. Soc. N.S.W. Oct., 1898.

EXPLANATION OF PLATES.

Plate X.

E. lævopinea.

Fig. 1.—Sucker leaves.
Fig. 2.—One of the larger leaves.
Fig. 3.—Twig, with buds.
Fig. 4.—Section of bud (enlarged).
Fig. 5.—Anther, back and front view (enlarged).
Figs. 6-9.—Fruits.
Fig. 10.—Buds of *E. lævopinea*, var. *minor*.

Plate XI.

E. dextropinea.

Fig. 1.—Sucker leaves.
Fig. 2.—One of the larger leaves.
Fig. 3.—Twig, with buds.
Fig. 4.—Section of bud (enlarged).
Fig. 5.—Anther (enlarged).
Figs. 6-10—Fruits.

A DESCRIPTION OF CERTAIN OBJECTS OF UNKNOWN SIGNIFICANCE, FORMERLY USED BY SOME NEW SOUTH WALES TRIBES.

By Walter R. Harper.

(Communicated by R. T. Baker, F.L.S.)

(Plates XII.-XVIII.)

My opening duty in this paper must be to gratefully acknowledge the assistance I have had in its preparation. I am indeed indebted to Professor W. Baldwin Spencer, of Melbourne University, who not only sent me his own specimen and procured me others, but also it was by his advice that I greatly extended my researches, and can now offer descriptions of nine of these curious objects instead of two. To the Trustees of the Australian Museum I owe four of the stones, and Mr. R. Etheridge (Curator of the Museum) assisted me most generously. Mr. R. T. Baker (Curator of Technological Museum), in addition to lending me his two specimens, also figured for me one sent from Adelaide. Dr. Stirling (Curator of South Australian Museum) sent me, through Professor Spencer, the two specimens in his collection; and Dr. Cookson (Mineralogist of Australian Museum) was [redacted]

The principal difficulty in arriving at any conclusion as to the use of these "stones" (I call them "stones" for convenience, although some are composed of clay and some of slate) lies in the fact that we have practically no detailed record of their discovery, no note of any enquiries made on the spot or amongst the surrounding aboriginal tribes.

They have been found on, or some feet below, the surface, and sent to the present owners—sometimes with a suggestion as to their use, *e.g*, "Ceremonial stone" in the case of No. 2, "Tomb-stone" in the case of No. 7, and "Record of the Dead" in the case of No. 1. But these are merely conjectures, not the results of strict investigation, and proofs must be forthcoming before we can accept them.

None of these objects have been found within 300 miles of the eastern coast, but otherwise they were distributed over a very wide area of western New South Wales. Some have been found on the Lachlan, others west of the Darling, and one on the Barcoo in Eastern Central Australia In shape the marked specimens (and it is of these I am speaking more particularly) resemble nothing so much as—to use a vulgar comparison—enormous cigars. Just as various brands of cigars differ somewhat in shape, so do these "stones," but no more.

The process of manufacture seems to have been the same in every case. A block of clay, slate, or sandstone has been roughly hewn near to the desired shape, and then smoothed and finished with a piece of some harder material. The circular cavity at the base has possibly been made by rubbing a pebble round and round. Some difference of opinion exists as to No. 7. It has been suggested that this specimen was moulded from damp clay, and not cut out of a solid block. This may be so, but as the use of the objects is evidently not determined by their composition I did not think it necessary to have an analysis made.

The markings, although apparently all derived from two main types, are very unequal in size, depth and length They have probably all been made with a sharp flake of quartz, but of course a piece of hoop-iron or steel would make similar marks.

The two principal designs, if such they can be called, are a gash and a mark very like the well-known "broad-arrow." The gashes are sometimes long and deep, sometimes short and faint; they run either perpendicular or else parallel to the base.

The "broad-arrows" (I shall use this term, although probably these markings had quite another significance) have been made by three cuts. Occasionally only one barb appears, and I shall speak of these as "incomplete arrows." And, again, the barbs are sometimes continued so as to cross each other—these I shall call "cross-barbed arrows."

The gashes appear in pairs, in groups of three, four, and so on to beyond a score, one under the other or ranged side by side.

The appended diagrammatic sketches of the markings (Pl. XIII., figs. 1-2) on the most elaborately carved specimen (No. 1) will give an idea of their general character and distribution throughout the series. One also shows a star-like ornament, formed, I believe, by three "arrows" meeting, peculiar to this specimen

The question at once arises: "Are these markings symbolical or are they decorative?"

If it could be said that they all have a certain significance, and that arranged thus they conveyed to the initiated a certain meaning, we would have gone far in determining the use of the "stones." For my part I am inclined to think they are merely

Many marks, gashes and scratches, representative of all the varieties of decorations met with in the series, are scattered profusely over its surface, as shown on the rough sketches (Pl. XIII.) The base, with the exception of a ring round the edge of 4 mm. in width, has been hollowed out to a depth of about 6 mm. in the centre, and this concave portion is traversed by four faintly marked ridges.

The most noticeable of the markings are a clearly cut "broad-arrow" near the top, four perpendicular and parallel lines a little lower down, and a group of three "broad-arrows," joined at their points in the form of a star, near the foot. In addition to these, on the opposite side of the object, there are a number of "broad-arrows" and horizontal and oblique scratches. On this stone, as well as on No. 6, there are several marks which have the appearance of incomplete arrows, the barb being cut on one side only. However, judging from the frequency with which this design occurs, the omission was intentional. All the marks are distinctly defined, and nowhere, on the decorated surface of the stone, is there an indication of its having been rubbed or rolled over any hard or resisting substances. In fact the only wear this part of the object has been subjected to is such as might be caused by continual handling. The same must be said of the base. The apex of the "stone" has been fractured, apparently in process of manufacture, but the foot has been chipped, in all probability, since the markings were put on. It must be remembered that it is the foot and *not the base* of the object which exhibits these traces of, comparatively speaking, rough usage; the base is quite smooth and even, with the exception of the four decorative ridges previously referred to, and the rim of the concavity shows no signs of the wear noticeable on the outside edge of the ring.

No. 2 (Pl. XIV. fig. 1) is in the South Australian Museum, Adelaide, and was discovered at Kanowna in the Barcoo District. It is composed of slate, and its height, 55·8 c.m , is greater than that of any other stone in the series. It differs also in form, for, while the remaining eight stones are symmetrically rounded, this specimen is almost rectangular in its lower half, and in its upper

part still rectangular, but very uneven, owing to a rather large piece having been chipped out of the apex on one side, and to fractures extending from the apex down for about 8 cm. (greatest) along one corner of this side. These fractures, excepting perhaps that at the apex, were probably caused after the completion of the stone, since the markings present on the uninjured edges extend to within 3 cm. of the top, whereas they have here been obliterated down to about 8 cm. It is worthy of notice that the gashes immediately underneath this fracture, and extending across the flat surface of the stone at right angles to it, are as clearly and as sharply defined as anywhere else on the specimen. The stone is asymmetrical in shape, and although, with the exceptions indicated, the surface is smooth, it is very irregular in contour. Evidently not nearly so much care and attention have been devoted to its preparation as with some of the other specimens. That the inequalities have not been caused by wear, but in process of manufacture, is proved by the state of the markings. The angles are not sharp but rounded, and it is along these the principal markings occur. There seems to be no regularity in the arrangement of the gashes—they are distributed along the four edges of the stone in fours, fives, &c., until, near the apex, from 20 to 50 short notches one under the other have been cut on each edge. At 14·5 cm. from the base a groove has been cut right round, and a number of the usual horizontal gashes are spread over the flat

No. 3 (Pl. XIV. fig. 2) is in the South Australian Museum, Adelaide. It was discovered in 1889 at Lake Menindee, County of Menindee, west of the Darling River, N.S. Wales, and was sent to the museum with a note—"Used in certain ceremonies." It is, I think, the top part of a larger specimen, for the base is very rough and uneven, and although an attempt had been made to hollow it out this attempt was abandoned. It is composed of slate, 33 cm. in height, and is almost circular in section, the diameters of the base being 5 cm and 5·2 cm. It tapers much more gradually than the other specimens, the greatest circumference (at the base) being 16·8 cm., whilst at 5 cm. from the apex the circumference is 13·6 cm. The markings upon it are few, consisting of several rather long gashes running parallel to the base, and a number of short and, for the most part, ill-defined cuts scattered about the lower half of the object. The only other decoration is an irregular spiral incision which winds three times round the top, and thus accentuates the resemblance of the "stone" to a lingam. This mark is evidently of much more recent date than the others. The "stone," base and apex included, has been highly polished by continual handling.

Weight, 3lbs. 8ozs.

No. 4 (Pl. XVI. fig. 1) is in the Australian Museum, Sydney. Nothing is known concerning its discovery. It is composed of sandstone 36·4 cm. in length, and is almost circular in section; its greatest circumference is 23·2 cm., and the base is concave. This stone differs altogether from the others, in that it shows very evident signs of having been used rather extensively for rubbing or grinding. The stone when found was in two pieces, and it is the upper part which presents this appearance more particularly, but one side of the lower piece has also been used in a similar fashion. Dr. Cooksey, of the Australian Museum, suggested that the wear looked exactly like that noticeable on stones used for sharpening scythes, and probably some European had been using it for such a purpose. This is not unlikely. Perhaps some semi-civilised black, ignorant of its proper use, may have employed it in putting an edge on his steel tomahawk, or

even, in default of a better stone near at hand, used it for grinding seed. Be that as it may, it is evident the stone was never intended for a sharpening or grinding stone, because wherever the signs of wear exist there all traces of the decorative marks have disappeared, and the originally smooth and rounded contour of the stone has been in a measure destroyed. The marks remaining on this stone are the usual short cuts arranged in pairs.

It seems to me contrary to everything we know of our aborigines to suppose they would, for days perhaps, employ themselves in cutting out, smoothing and decorating a piece of sandstone, and then immediately set to work to destroy the shape and obliterate the decorations by using the object as a grinder.

It is worthy of notice that, as this stone is the only one of the series which has *undoubtedly* been used as a grinder of some sort, so from this one only have any of the decorations been removed, thus indicating plainly enough what would have been the appearance of the other specimens had they been so used.

Weight, 4lbs. 2ozs.

No. 5 (Pl. xvi. fig. 2) is in the Australian Museum, and was found near Ivanhoe in the County of Mossgiel, N.S.W. It is of sandstone, and very similar in shape to the preceding specimen. Its height is 41·3 cm., and the greatest circumference is 22·7 cm. In addition to a number of long and short parallel cuts scattered over the surface irregularly, a gash 14 cm. in length runs from

never utilised in the same manner as No. 4, has nevertheless suffered a good deal of hard usage, and on one side shows slight signs of wear, caused possibly by rubbing along some hard surface. When found it was in three pieces, and the foot is, as usual, damaged.

The weight is 4lbs. 11½ozs.

No. 6 (Pl. XVII. fig. 1) is in the Australian Museum, Sydney, and was found between Trundle and the Lachlan River in the County of Ashburnham, N.S.W. This and the succeeding specimen are composed of an impure clay, and in this differ from the others, but in their shape, their concave bases, and the character of their markings they are analogous to them. It is 24·8 cm. in height, and the greatest circumference is 28 cm. The base is slightly concave, and marked across by a number of well-defined and clearly cut ridges radiating from a common centre. By oxidation a slight red colouring has spread over the "stone" since the marks were put on, but a scratch will remove this and disclose the almost white composition underneath. The markings are similar to those on the preceding specimens, but the "broad-arrows" are badly cut, and in some cases (this may be intentional) the barbs have been continued so as to intersect and form a cross at the end of the shaft. Occasionally only one of the barbs has been continued, and elsewhere the marks I have styled "incomplete arrows" appear. To take one view of the stone—that shown in the photograph—at the top there is an incision passing about half-way round; below this is a badly executed arrow, and then follow three more arrows (the last of which has the "cross-barbs" referred to above), one directly underneath the other, and each pointing towards the base. Parallel to this line of arrows, and on one side, is ranged a series of short deep horizontal cuts, and on the other side more arrows similarly arranged to the first series. This "stone," as usual, is chipped at the foot, and although the rather sharp ridges on the base show practically no signs of hard usage it is evident that the foot of the object was thus damaged before it was lost or cast aside, since the fractured

surface is oxidated. Several chips have been knocked out on one side since the recovery of the "stone."

Weight, 3lbs. 14½ozs.

No. 7* (Pl. XVIII. fig. 1) is in the possession of Mr. R. T. Baker, Curator of Technological Museum, Sydney, and was found 6 feet below the surface whilst sinking a tank through the red soil near Coolabah, County of Canbelego, N.S.W. It is composed of a clay similar to that of the preceding specimen, but much softer; in fact it crumbles away if rubbed with the finger, and will write upon a board very like a chalk crayon. It is almost circular in section, the diameters of the base being 5 cm. and 4·2 cm.; the height is 29·5 cm, and the greatest circumference, taken just above the worn portion (about 3·5 cm. from the base) is 18·6 cm. The base is hollowed out to a depth of 6 mm. in the centre. The concavity is smooth and regular, and, as in the case of No. 1, the signs of wear only appear on the outer edge of the ring and at the foot of the "stone." The surface of this stone has also been stained a light red by oxidation. The markings, though numerous, are all of the same nature, and occur generally in pairs. They are, as usual, unequal, ranging from 1 to 6 cm. in length, and very shallow, some of them being little more than scratches. There are 26 of the larger cuts in 13 pairs, starting at 3 cm. from the top and disposed irregularly round the "stone" to within 5 cm. from the base. In addition to the larger cuts are

The foregoing seven specimens should, I think, be classed together and considered separately from the remaining two. Although some are composed of slate, some of sandstone and some of clay, it is plain from the identity of the signs of wear at the lower ends that they were all used for the same purpose or in the same manner. Again, the bases are concave in every case, and the decorations are of the same nature and design, for no markings appear on the clay specimens which are not also present on the stone and slate, and none on the slate which are not represented on the stone and clay. In fact, treating the "incomplete arrows" (Nos. 1 and 6) and the "cross-barbs" (No. 6) as variations of the "broad-arrow," we find that, of the three stones on which both the typical markings ("broad-arrows" and horizontal or perpendicular gashes) are engraved, one is slate (No. 1), one is stone (No. 5) and one is clay (No. 7).

The similarity in decoration, in form of base, and, above all, in signs of wear, is surely sufficient evidence—in the absence of direct proofs to the contrary—that, although fashioned by different hands, of different materials, in widely separated localities—the same ideas, intentions, designs, were responsible for their existence, determined their use and regulated their construction. A good deal depends on this classification, for it is evident that a heavy piece of slate may be put to uses impossible for a piece of clay, and in endeavouring to arrive at any conclusion as to the object for which the "stones" were made, it is necessary to remember this difference of composition.

The two remaining stones differ from the preceding seven, not only in shape and in the absence of signs of the wear so noticeable on the others, but also in having even bases and practically no decorative markings. It is possible links may be later discovered connecting these with the first series, but for the present I think it better to keep them quite distinct. In this paper I propose to confine myself almost exclusively to the upright stones, but, as no satisfactory explanation has been given as to the use made of these curious curved specimens, I have thought it advisable to include photographs and descriptions of them.

No. 8 (Pl. xvii. fig. 2.) is in the Australian Museum, Sydney, and was found near the Lachlan River, N.S.W. It is large and heavy (weight, 6lbs. 9ozs.), and is composed of sandstone. The circumference at the base, which is oval, is 17·4 cm., and the greatest circumference, at about the middle of the stone where the section is much flatter, is 28·5 cm. The length from base to apex is 37·7 cm., and the height of the specimen when stood on end, in which position, by the way, it will remain unsupported, is 32·5 cm.

The markings are few. Running round the top of the stone about 12 mm. from the tip is a well-defined groove, and 3 cm. below this are two nearly parallel scratches about 4 cm. in length. The stone shows no traces of wear beyond the abrasion, consequent upon exposure to the weather, and the transference of such a heavy object from place to place. The lower end is as smooth as the upper.

No. 9 (Pl. xviii. fig. 2) is in the possession of Mr. R. T. Baker, Curator of Technological Museum, Sydney. It was found near Wilcannia, County of Young, N.S.W. It is composed of sandstone, and although more rounded than the previous specimen, oval in section, the diameters of the base being 5·8 cm. and 4·7 cm. The circumference at the base is 18·2 cm., and the greatest circumference, at about a fourth of the way up, is 22·4 cm.; the length is 35 cm., and the height 26 cm. There are no decorations

placed on the table and crushed by rubbing the hand-stone backwards and forwards over them. Sometimes two hand-stones are used, one in either hand, and sometimes the grinder is given a sweeping circular motion. It is of course the hand-stones which principally concern us. These assume slightly different shapes, but this is owing to chance, for the aboriginal wastes no time in preparing them, and any stone which has one flat surface, and may be held in the hand, will suit his purpose. Specimens of grinders, smooth on both sides, circular in shape, and from 1 to 3 inches in thickness are shown in the various Museums, but, as a general rule, a large water-worn pebble or an irregular piece of sandstone, smooth on one side, is used. I have seen grinders formed by striking the end off a pebble instead of the side; this gives the stone a somewhat conical appearance, but nothing resembling the shape of the objects under consideration. The larger hand-stones have sometimes one or more hollows in the upper surface, thus affording the operator a firmer grasp. So little are the hand-stones valued by the aborigines that a woman, finding her burden too heavy, will unhesitatingly cast them aside.

Dr. Stirling says (Report Horn Exped. Vol. iv. p. 100):—"As suitable bed-stones cannot be everywhere obtained they are carried from camp to camp, often for long distances; the hand-stones, however, can be picked up anywhere, and were frequently found lying about in abandoned camps."

This style of mill is generally used also for pounding, but in some districts special stones are used as pestles and mortars. The mortar consists of a circular or oval slab of stone from 6 to 12 inches in diameter, hollowed in the centre, and is usually formed from a harder material than that employed for "grinding tables." The pestle is sometimes identical with the hand-stone I have just described, but is more frequently an oval or rounded pebble about the size of an orange, a flat base not being absolutely necessary for pounding work.

It will at once be seen what a vast difference lies between these stones and those which form the subject of this enquiry. The first are the work of an hour; the second the labour of days. The

former are most convenient mill-stones; the latter quite unsuitable. But the insuperable objection to the grinder theory is the total absence of all the signs of wear which must necessarily have appeared upon stones put to such a use.*

Stones of this shape might have been used as grinders or pounders in three different ways—(1) held by one end and rubbed backwards and forwards; (2) held by the apex in a perpendicular fashion and used as a pestle; (3) held by the apex whilst the substance to be pounded was struck at an angle.

No. 4 stone shows us what to expect if the first method had been adopted; all the markings would have been obliterated. The state of the concave, radiated or ribbed bases, proves the second impossible. The third is an attempt to explain why the signs of wear appear only at the foot of the "stones" and nowhere else.†

I believe that when we can say positively what has caused this peculiar wear, we shall have solved the mystery, and no explanation which does not account for it can be satisfactory. But surely *this* idea of its origin is far-fetched.

If the angle was at all high, the base must have suffered considerably; if at all low, then the wear must have extended much further up the stone than is actually the case.

Again, judging from the length and composition of the objects, they would probably have all broken in the middle if so used: the

ing, immense labour of fashioning these "stones" merely for grinding seeds unless they possessed some special advantages over the ordinary grinders. It will be admitted that the onus of proof of these advantages lies with those ethnologists who maintain they were intended so to be used.

If, as is sometimes the case, a sheet of bark was substituted for the sandstone table, the wear would have been more gradual, but none the less sure.

This matter of wear is the most important objection to the "seed-grinder" theory, but other questions arise: Why did a woman (for grinding is a woman's duty, and hers is the task of collecting and preparing all vegetable food) choose soft clay for a hand-stone? Why are the bases concave? Why did she decorate these stones and leave her other grinders plain?

If it be suggested that they were only used by the men, upon special occasions for special purposes, grinding or otherwise, then they are no longer domestic implements, but "ceremonial stones."

The "Ceremonial Stone" theory seems to have something to recommend it. The blacks of Western N S. Wales in the districts where most of these objects were found carved their weapons of warfare and the chase, the trees around their chief's grave, and the earth and trees of an initiation ground,* but why did they carve these stones? Idle fancy could not have guided their hands, for here are nine specimens, found hundreds of miles apart, all exhibiting similar features. Besides, a black might cut gashes in a tree trunk just to try his new hatchet, or he might daub grotesque designs on the roof of a cave merely for amusement, but he will not laboriously carve out and decorate a solid block of slate or sandstone for nothing; or if one eccentric individual would do so, half-a-dozen would not be guilty of the same waste of energy.

These "stones" are certainly not weapons; their markings prove they have nothing in common with memorial trees; then

* The rock carvings of the Eastern Coast are, I believe, altogether absent from Western N.S.W.

may they not have been used in some ceremony—not necessarily the "Bora"? The difference in composition would of course not militate against this theory. Again, if they are ceremonial stones then it is certain they must have been used for similar ceremonies. The wide area over which they were found does not prohibit this, for other ceremonies, such as "circumcision" or "rainmaking" extend much farther.

Gason* writes of many ceremonies (food-producing, &c.) practised by the Cooper's Creek tribe. Is it not possible that, although traces of them no longer exist, similar ceremonies were once known in Western N.S.W.? The aboriginal spares no pains and will go to infinite trouble in the preparation of the paraphernalia necessary for the successful issue of any of his sacred rites, and would never hesitate to carve a stone for such a purpose. But it is useless for us to call the objects "ceremonial stones" unless we can indicate what ceremony they were used for, and explain in what way they were used, so as to cause the wearing and fractures at the foot of each.

The markings, if merely decorative, as I believe they are, will not help us much; the "emu-tracks" or "broad-arrows" present on three of the specimens are common decorations of N.S.W. initiation grounds, and that is all we can say.†

Phallic Emblems.—One theory which may be said to suggest

anything of the nature of true phallic worship was ever known amongst our blacks, I am disinclined to believe. References to the yoni and lingam are very frequent in their stories and corroborees; several practices at the initiation ceremonies and in the healing of the sick have probably a phallic significance, but these are owing either to an indulgence of their brute appetites or to a recognition of the importance of the generative organs; the element of worship is entirely lacking. Several other objections may suggest themselves—such as the wear at the foot, the concave bases, the markings, &c., but after all the principal objection is that this theory is opposed to all we at present know of the genius of the Australian aborigines; and unless some better excuse for styling the "stones" phallic "emblems" than that furnished by their shape can be found, we are not justified in considering them as such.*

A sort of compromise between the "pounder" and "ceremonial" theories is that the "stones" formed part of the stock-in-trade of an aboriginal "koradjie"—sorcerer—wizard. I have myself heard it stated, and it is not impossible, that in the preparation of "charms," &c., the sorcerer used a special kind of pounder. That this pounder should differ very much from those ordinarily in use is to be expected, and from what we know of these men the desire for novelty—something "out of the way"—would overcome all the evident objections on account of inconvenience or unsuitability. The markings would be decorative. But even supposing we allow that, if used only occasionally on the softest substances and with extreme care, the signs of wear would not be more noticeable than they actually are, still, is it a fact that sorcerers did use such pounders? What were the constituents of the substance pounded? If they were fat, oil and refuse, as is usually the case, why do not the softer stones show the signs

* James Bonwick in "The Daily Life of the Tasmanians," p. 195, mentions several native customs possibly phallic in their origin, but I very much doubt whether he is right in claiming the "broad-arrow" as a phallic symbol in Australia.

thereof? And why employ a pounder weighing 4 or 5 lbs. for such work?

The two other suggestions I have already referred to, viz, "Tombstones" and "Records of the Dead," have so many serious objections against and (as far as I have been able to learn) nothing in favour of them, that it would be useless for me to do more than mention them here. If it be thought that the same remark would apply equally to certain of the other theories examined, then my excuse is that the character of the stones is brought out more distinctly by such an examination than by a simple descriptive catalogue.

Finally, authorities are divided as to whether they are "pounders" or "ceremonial stones"; in the state of our present knowledge we may style them either the one or the other. This is very unsatisfactory, and it must be the hope of every Australian ethnologist that the question will hereafter be definitely settled.

Editorial Postscript—Stone No. 7 (*antea*, p. 428) was exhibited at the Society's Meeting of September 26th, 1888. By an oversight the notice of the exhibit does not appear in the Proceedings for 1888, but it is thus referred to in the Abstract of the date mentioned :—

"Mr. Maiden exhibited, on behalf of the Rev. J. Milne Curran, an aboriginal relic or implement of undetermined character.

NOTES AND EXHIBITS.

Mr. W. W. Froggatt exhibited a twig from a fruit-tree obtained near Sydney which had 150 eggs of an undetermined grasshopper attached to it in a double row; also a number of the newly hatched young insects. These were of interest because of their remarkable resemblance to a common ant (*Iridomyrmex purpureus*, Sm.), which is plentiful in the orchards and bush about Sydney, hunting over the trees for food. It seems probable that this may be a case of protective mimicry, the grasshoppers perhaps being protected against the attacks of insectivorous birds, and the ants also deceived. Brunner has described a remarkable little *Phaneropterid* from the Soudan under the name of *Myrmecophana fallax* which is very like the insect exhibited. In Brunner's species the under part of the base of the abdomen is white, so that the grasshopper looks as if it had a stalked abdomen when viewed from the side. As the insect was wingless and without an ovipositor, it may have been immature like those exhibited.

Mr. J. Mitchell, of Newcastle, forwarded a brief note announcing his discovery of the print of an insect's wing in the shale overlying the Yard Seam of coal at the base of Flagstaff Hill, Newcastle. There was, he believed, no previous record of the presence of insect remains in rocks of the Permo-Carboniferous Age in New South Wales. He hoped to be able to exhibit the specimen at a future meeting.

Mr. Maiden showed herbarium specimens of the Eucalypt described in his paper.

Mr. Baker exhibited herbarium specimens of, and essential oils and extracts from the two Eucalypts described in his paper. Also, in illustration of Mr. Harper's paper, photographs and drawings of the aboriginal stones treated of therein.

Mr. Palmer exhibited a living Gecko, *Gymnodactylus platyurus*, White, and a large snake, *Diemenia superciliosa*, Fischer, from the Blue Mountains. Also, from the Mountains, plants of two

species of *Xerotes* (N.O. *Juncaceæ*) with harsh cutting or wiry foliage, eaten down by stock, to show the inhospitable kind of fodder to which, under stress of circumstances, the mountain cattle become habituated, and upon which they manage to maintain themselves. Cattle brought from the lowlands do not, however, all at once or readily take kindly to such apparently unpromising forage plants.

WEDNESDAY, OCTOBER 26TH, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, October 26th, 1898.

Professor J. T. Wilson, M.B, President, in the Chair.

DONATIONS.

Royal Society of New South Wales, Sydney—Abstract of Proceedings, September 7th and October 5th, 1898. *From the Society.*

La Nuova Notarisia, Padova. Serie ix. Luglio-Settembre, 1898. *From the Editor, Dr. G. B. De Toni.*

Museum of Comparative Zoology, Harvard College, Cambridge, Mass.—Bulletin Vol. xxxii. No. 8 (August, 1898). *From the Director.*

Geological Survey of Western Australia—Annual Progress Report for the Year 1897. *From the Government Geologist.*

Western Australian Year-Book for 1896-97 (Tenth Edition): A Land of Promise, West Australia in 1897-98. Second Edition. By authority. *From the Principal Librarian, Victoria Public Library, Perth.*

Queensland Museum, Brisbane—Annual Report of the Trustees for the Years 1891, 1892, 1893, 1895 and 1896: Aunual Report of British New Guinea, 1890-91, 1891-92, 1892-93, 1893-94, 1894-95. *From the Curator, Queensland Museum.*

Société Royale Malacologique de Belgique, **Bruxelles**—Annales. Tomes xxviii-xxxi., Fascicule i. (1893-96): **Procès-Verbaux** des Séances. T. xxiv. Juin-Decembre, 1895; **T. xxv-xxvi.** (1896-97); T. xxvii. Jan.-Juillet, 1898. *From the Society.*

Comité Géologique St. Pétersbourg – **Bulletin. T. xvii.**, Nos. 1-3 (1898): Supplément au T. xvi. (1897). *From the Committee.*

Perak Government Gazette, Taiping. **Vol. xi. Nos.** 23-26 (August-September, 1898). *From the Government Secretary.*

Zoologischer Anzeiger. xxi. Band. Nos. 566-568 (August-September, 1898). *From the Editor.*

Indian Museum, Calcutta—**Natural History Notes from H.M.** Indian Marine Survey Steamer "Investigator." **Series ii.** Nos. 20-22 and 25 (1895-98). *From the Superintendent.*

Pharmaceutical Journal of Australasia, **Sydney. Vol. xi.** No. 9 (September, 1898). *From the Editor.*

Nova Scotian Institute of Science, **Halifax—Proceedings** and Transactions. Vol. ix. Part 3 (Session 1896-97). *From the Society.*

Academy of Natural Sciences of **Philadelphia—Proceedings**, 1897. Part iii. (Oct.-Dec.). *From the Society.*

California Academy of Sciences, San Francisco—Proceedings. Third Series: *Botany.* Vol. i. No. 2; *Geology.* Vol. i. No. 3; *Zoology.* Vol. i. No. 5 (1897). *From the Academy.*

Denison University, Granville, Ohio—Bulletin of the Scientific Laboratories. Vol. ix. Part 2 (March, 1897). *From the University.*

Essex Institute, Salem, Mass.—Bulletin. Vol. xxvi. Nos 4-12; Vol. xxvii. Nos. 1-12; Vol. xxviii. Nos. 1-6; Vol. xxix. Nos. 1-6 (1894-97). *From the Institute.*

Field Columbian Museum, Chicago—Anthropological Series. Vol. ii. No. 2; Botanical Series. Vol. i. No. 4; Zoological Series. Vol. i. Nos. 8-10: Report Series. Vol. i. No. 3 (Nos. 22-27; Oct., 1897-March, 1898). *From the Museum.*

Indiana Academy of Science, Indianopolis—Proceedings, 1896. *From the Academy.*

Meriden Scientific Association — Transactions. Vol. viii. (1897-98). *From the Association.*

Smithsonian Institution: U.S. National Museum, Washington —Report for the Year ending June 30th, 1895: Proceedings. Vol. xix. (1897): Pamphlet "Directions for Collecting and Preserving Scale Insects (1897)." *From the Secretary.*

Tufts College, Mass.—Studies. No 5 (March, 1898). *From the College.*

Wagner Free Institute of Science, Philadelphia—Transactions. Vol. v. (Jan., 1898). *From the Institute.*

Museu Nacional do Rio de Janeiro—Revista. Vol. i. (1896). *From the Museum.*

Gesellschaft für Erdkunde zu Berlin—Verhandlungen. Band xxiv. (1897), Nos. 7-10; Bd. xxv. (1898), No. 1: Zeitschrift. Band xxxii. (1897), Nos. 4-5. *From the Society.*

K.K. Zoologisch-Botanische Gesellschaft in Wien—Verhandlungen. xlvii. Band (1897), Nos. 1-10. *From the Society.*

K. K. Naturhistorisches Hofmuseum in Wien—**Annalen.** Band xii. Nr. 1-4 (1897). *From the Museum.*

K. Leopoldino-Carolinische Deutsche **Akademie der Naturforscher**, in Halle—**Leopoldina.** xxxiii. **Heft (1897) : Nova Acta.** Band lxviii. (1897); Band lxix. Nr. i. (1896). *From the Academy.*

Naturhistorisches Museum in Hamburg—**Mitteilungen.** xiv. Jahrgang (1897). *From the Museum.*

Société Belge de Microscopie à **Bruxelles—Annales.** Tome xxii. 2e Fasc. (1898): Bulletin. **xxiii.me Année** (1896-97). No. 11. *From the Society.*

Société Entomologique de Belgique à **Bruxelles**—Annales. Tome xli. (1897): Mémoires. No. vi. (1897). *From the Society.*

Société Royale de Botanique de Belgique à **Bruxelles**—Bulletin. Tome xxxvi. (1897). *From the Society.*

Manchester Literary and Philosophical **Society—Memoirs** and Proceedings. Vol. xlii. (1897-98). **Part 4.** *From the Society.*

Societas Entomologica Rossica, St. **Petersburg—Horæ** T. xxxii. Nos. 1-2 (1898). *From the Society.*

Museu Paulista, S. Paulo– Revista. **Vol. i. (1895).** *From the Museum.*

Journal de Conchyliologie, Paris. **Vol. xlvi. No. 1** (1898). *From the Director.*

Department of Mines and Agriculture, Sydney: Geological Survey—Memoirs. Palæontology. No 6. Descriptions of the Palæozoic Fossils of New South Wales. By the late L. D. de Koninck, D.Sc., M.D. (English Translation, 1898): Mineral Resources. No. 4. Notes on the Occurrence of Bismuth Ores in New South Wales By J. H. Watt, M.A., B.Sc. (1898). Agricultural Gazette. Vol. ix. Part 9 (September). *From the Hon. the Minister for Mines and Agriculture.*

The Surveyor, Sydney. Vol. xi. No. 10 (October, 1898). *From the Editor.*

American Naturalist. Vol. xxxii. No. 380 (August, 1898). *From the Editor.*

U.S. Department of Agriculture, Washington: Division of Physiology and Pathology—Bulletin. No. 15. Some Edible and Poisonous Fungi. By D. W. G Farlow (1898): One Excerpt from the Yearbook for 1897 (Hybrids and their Utilization in Plant Breeding). *From the Secretary of Agriculture.*

A Statistical Account of the Seven Colonies of Australasia, 1897-98. Seventh Issue. By T. A. Coghlan, Government Statistician. *From the Author.*

Australasian Journal of Pharmacy, Melbourne. Vol. xiii. No. 154 (October, 1898). *From the Editor.*

ON *CARABIDÆ* FROM WEST AUSTRALIA, SENT BY MR. A. M. LEA (WITH DESCRIPTIONS OF NEW GENERA AND SPECIES, SYNOPTIC TABLES, &c.).

By Thomas G. Sloane.

Mr. A. M. Lea, of the Bureau of Agriculture, West Australia, has sent to me, for inspection and report, a large number of insects of the family Carabidæ from different parts of the Colony of West Australia, and the following paper comprises the results of my examination of the collections he has forwarded. The Carabidæ treated of consist of collections from two widely separated districts, viz., those from South-West Australia and the neighbourhood of Champion Bay, mostly collected by Mr. Lea; and those from the East Kimberley District (localities Wyndham on Cambridge Gulf, Behn River and Upper Ord River), collected by Mr. Richard Helms.

In order to assist the elucidation of the facts connected with the distribution of the Carabidæ in Australia, I have, in some cases, brought together and tabulated the genera of tribes that have hitherto been scattered in a somewhat haphazard manner, thereby enabling more accurate comparisons to be made between the faunas of different parts of the continent.

The arrangement of the tribes adopted by Dr. G. H. Horn in

Family CARABIDÆ.

Subfamily CARABINÆ.

Tribe *SCARITINI.*

Group **Scaritides.**

Genus GEOSCAPTUS.

1. G. sp.? *Hab.*—Upper Ord River (Helms). Two examples of a species intermediate between *G. lævissimus*, Chaud., and *G. cacus*, Macl., and also differing from *G. crassus*, Sl. I cannot determine it, but am not prepared to describe it as new.

Group **Carenides.**

Genus SCARAPHITES.

2. Sc. LATICOLLIS, Macl.; Mast. Cat. Sp. 458. *Hab.*—Upper Ord River (Helms).

3. Sc. SILENUS, Westw.; l.c. Sp. 466. *Hab.*—Swan River, Donnybrook (Lea).

4. Sc. LUCIDUS, Chaud.; l.c. Sp. 461. *Hab.*—Bunbury (Lea).

5. Sc. sp.? *Hab.*—Mount Barker (Lea, one immature example).

Genus CARENUM.

6. C. OCCIDENTALE, Sl., P.L.S.N.S.W. 1897, xxii. p. 195. *Hab.*—Geraldton and Mullewa (Lea).

7. C. LÆVIPENNE, Macl.; Mast. Cat. Sp. 374. *Hab.*—Mount Barker (Lea and Helms).

Genus EUTOMA.

8. E. VIOLACEUM, Macl.; l.c. Sp. 337. *Hab.*—Darling Range Mount Barker (Lea).

Genus CARENIDIUM.

9. C. LEAI, Sl., P.L.S.N.S.W. 1897, xxii. p. 223. *Hab.*—Geraldton and Mullewa (Lea).

Group **Clivinides.**

Genus CLIVINA.

10. C. CRIBROSA, Putz.; Mast. Cat. Sp. 506. *Hab.*—Beverley (Lea).

11. C. CORONATA, Putz.; l.c. Sp. 505. *Hab.*—Mount Barker (Lea).

12. C. DORSALIS, Blkb.; l.c. Supp. Sp. 7393. *Hab.*—Beverley (Lea).

13. C. OLLIFFI, Sl., P.L.S.N.S.W. 1896, xxi. p. 185. *Hab.*—Beverley, Geraldton (Lea).

14 C. ANGUSTIPES, Putz.; Mast. Cat. Sp. 498. *Hab.*—Swan River, Newcastle, Donnybrook, Pinjarrah (Lea).

Subfamily **HARPALINÆ.**

Division **Harpalinæ unisetosæ.**

Tribe *BROSCINI.*

Genus GNATHOXYS.

15 GN. GRANULARIS, Westw.; l.c. Sp. 476. *Hab.*—Swan River, Geraldton and Mullewa (Lea); Dongara (Ward).

16. GN. INSIGNITUS, Macl.; l.c. Sp. 478. *Hab.*—Mount Barker (Lea).

17. GN. CRASSIPES, n.sp.

sharply defined fossula on each side of clypeus hardly extending on to front, clypeal suture strongly impressed between these fossulæ; preocular sulci hardly marked; eyes round, convex, not prominent; orbits widely and lightly swollen below eyes posteriorly; antennæ short, moniliform, second joint a little larger than fourth, joints 4-11 short, globular; penultimate joint of labial palpi bisetose in front. Labrum concave, longitudinally sulcate, truncate with external angles rounded. Prothorax short (4·2 × 5·3 mm.), very convex, lightly declivous to base in middle, widest about middle; sides rounded, roundly and sharply narrowed posteriorly and meeting base at right angles; anterior margin very lightly emarginate between anterior angles,—these marked, hardly advanced; basal angles rectangular; border narrow on sides, hardly wider at anterior angles, thick and entire on base; one or two marginal punctures at anterior fourth; median line lightly impressed. Elytra convex, wide (8·5 × 6·4 mm.), roundly subparallel on sides, widely rounded at apex, wide and truncate at base; shoulders projecting strongly from peduncle, shortly rounded; four rows of clusters of punctures on each elytron, punctures of first series in a single row, of second in a double row, of third and fourth in more irregular clusters, usually in depressions; space between fourth series and margin punctate; marginal channel narrow, obsoletely punctate. Prosternum roundly acclivous to anterior margin; a few piliferous punctures in front of and near inner angle of coxal cavities. Metasternal episterna (with epimera) oblong. Ventral segments bipunctate towards middle. Anterior femora short, dilatate in middle, anterior edge of lower side plurisetose in middle; intermediate femora thick, dilatate in middle, anterior side with a double row of closely placed strong setigerous punctures extending from base to near apex and curving upwards towards apex; posterior femora short, wide, lower side strongly and roundly dilatate in middle, anterior side setigero-punctate (a few of these punctures near upper margin a little before the middle). Length 13·5-16, breadth 5-6·4 mm.

Hab.—Rottnest Island, Geraldton (Lea).

Evidently allied to *Gn. obscurus*, Reiche, but Putzeys (Stett. Ent. Zeit. 1868, p. 375) describes that species as having the elytra hardly longer than broad (7·5 × 7 mm.); I think the punctures of the elytra must be arranged as in *Gn. obscurus*. It also has some affinity to *Gn. irregularis*, Westw., but judging from Westwood's description and figure differs by being smaller, the head not impressed behind the eyes, the prothorax with the border narrower and the margins not plurisetose. Putzeys' more detailed description (Stett. Ent. Zeit. 1868, 374) of *Gn. irregularis* suggests the following differences:—the postocular prominences are not large and prominent; the prothorax has not the sides straight in their anterior half, nor the margins wide, reflexed in front and quadripunctate on their anterior half.

18. Gn. sp.? *Hab*.—Donnybrook (Lea). One example of a species allied to and of same size as *Gn. insignitus*, Macl. More specimens would be required to deal satisfactorily with it.

19. Gn. sp.? *Hab*.—Swan River (Lea). One example of a species closely allied to *Gn. cicatricosus*, Reiche, from which it apparently differs (the marginal stria of the elytra is not punctate, nor the anterior angles of the prothorax widened), but not knowing *Gn. cicatricosus* in nature, I am unwilling to speak positively of the species before me from a single specimen.

20. Gn. sp.? *Hab*.—Newcastle (Lea). One example of a species that is closely allied to *Gn. westwoodi*, Putz., but which I cannot positively determine as that species.

Var. ? Differs slightly from the typical form by being wider, more obscurely coloured and having six (not five) punctures along lateral margin. *Hab.*—Bridgetown.

24. C. LONGIPES, n.sp.

♀. Elongate, disc of prothorax and elytra depressed; prothorax longer than broad, sides decidedly sinuate near base, anterior angles shortly but decidedly advanced; elytra oval; legs long, slender. Subopaque; head black with greenish reflections; prothorax black with greenish reflections; elytra greenish-black; under surface purple-brown; antennæ, palpi and legs piceous-brown.

Head convex, smooth, faintly transversely impressed behind eyes; front widely impressed on each side between antennæ, lightly convex in middle; eyes convex, not prominent; orbits lightly swollen behind eyes. Prothorax longer than broad (5 × 4·75 mm.), depressed; sides lightly rounded, very little narrowed to anterior angles, decidedly but gradually narrowed to base; anterior margin lightly emarginate; anterior angles shortly and obtusely advanced; base truncate; basal angles sharply rectangular; border narrow, thicker posteriorly, sinuate, and turned slightly downwards a little before base, extending along one-fourth of base on each side; median line finely impressed; basal area defined by a faint impression and strongly declivous to sides. Elytra oval (10 × 5·5 mm.), hardly narrowed to base, depressed on disc, smooth; sides lightly rounded; apex obtuse, not widely rounded; shoulders not marked (rounded off); border thick, reaching apex, angular close to peduncle; four submarginal punctures on each elytron, first behind shoulder, second just before apical curve, other two (a considerable distance apart) near apex. Anterior femora compressed, not swollen in middle, lower side flattened (subcanaliculate), tubercle on lower side near base small, depressed; posterior tarsi long, slender, first joint about as long as two succeeding ones together.

Length 17, breadth 5·5 mm.

Hab.—Coolgardie (White, one example).

Apart from differences in colour this species may be distinguished from *C. substriata*, Casteln., and *C. semiviolacea*, Casteln.,

by its more slender legs, the femora hardly swollen in the middle; the prothorax with sharply rectangular basal angles, the border lightly sinuate and a little bent downwards before meeting the base.

Note.—It is possible the specimen before me is not quite mature and that the metallic tints would be brighter in a fully developed example. Faint obsoletely punctate striæ are visible on the elytra, but these I consider a *post mortem* effect.

25. C. BRACHYPLEURA, n.sp.

♂. Oval, levigate, subdepressed; prothorax with sides shortly sinuate before base; elytra oval; four anterior tarsi with spongious tissue beneath, posterior tarsi short. Upper surface shining black, under surface shining bluish-black.

Head lightly and widely impressed across vertex; front subdepressed; vertex convex; eyes convex, prominent, lightly enclosed posteriorly. Labrum truncate (hardly emarginate), sulcate in middle. Prothorax hardly broader than long (4·25 × 4·3 mm.), convex, shortly narrowed to base; disc lightly and widely subdepressed; sides strongly rounded; anterior angles marked, hardly advanced; anterior margin lightly and widely emarginate; basal angles rectangular; border narrow, sinuate before base, obsolete in middle of base; median line lightly marked. Elytra widely oval (8 × 5·25 mm.), not wider towards apex, lightly convex, obsoletely substriate, gently declivous to apex, lightly declivous to base; sides rounded; border narrow, reaching peduncle, thicker on apical curve, not thickened on humeral curve or

Length 14, breadth 5·25 mm.

Hab.— Coolgardie (White, one example).

I have placed this species in the genus *Cerotalis* because the four anterior tarsi of the ♂ have spongiose tissue on the under surface of the same joints as the species of that genus; but it is a wider and shorter species than any other as yet assigned to *Cerotalis*, having more the facies of an *Adotela (e.g., A. concolor)*. The very short linear epimera of the metasternum are not found in the other species of *Cerotalis*.

Genus PROMECODERUS.

26. P. ALBANIENSIS, Casteln.; l.c. Sp. 582. *Hab.*—Bridgetown, Donnybrook (Lea).

27. P. SCAUROIDES, Casteln.; l.c. Sp. 615. *Hab.*—Swan River, Rottnest Island (Lea).

28. P. DYSCHIRIOIDES, Guér.; l.c. Sp. 590. *Hab.*—Newcastle (Lea).

29. P. INTERMEDIUS, n.sp.

♂. Elliptic-oval, robust, lævigate. Bronzed-black; legs black, tarsi and coxæ reddish. Head ordinary, convex; eyes prominent; postocular prominences about half size of eyes, sloping evenly behind. Prothorax a little broader than long (2·7 × 3 mm.), convex, lightly declivous to base; sides strongly rounded; anterior angles lightly marked, projecting a little from head; basal angles rectangular; border entire on base. Elytra oval, convex (5·5 × 3·7 mm.). Ventral segments roundly and deeply foveate laterally. Anterior tarsi with a small (almost obsolete) tuft of spongiose tissue below inner angle of three basal joints; intermediate tarsi without spongiose tissue beneath.

Length 10-11, breadth 3·7-4 mm.

Hab.—Mount Barker (Lea and Helms).

Closely resembling *P. ovipennis*, Sl., but differing by its darker colour, darker antennæ, piceous-black tibiæ; narrower head, more prominent eyes, smaller and less protuberant postocular prominences, clypeus not emarginate; prothorax narrower, less

declivous to base, anterior angles more marked, basal angles more marked; elytra less dilatate on sides, less strongly and less roundly ampliate from peduncle.

30. P. OVIPENNIS, n.sp.

Oval, robust, lævigate; head large; prothorax convex (rather depressed on disc), strongly angustate posteriorly, bordered at base; elytra oval, short, convex; mesosternal episterna quadrate, epimera short—twice as broad as long; ventral segments roundly foveate on each side. Shining, bronzed-black; under surface piceous with a faint metallic tinge laterally; legs piceous, tibiæ, tarsi, antennæ and palpi piceous-red.

♂. Head large, convex, wide at base; clypeal suture hardly impressed; clypeus roundly emarginate; eyes prominent, enclosed behind; orbits decidedly raised posteriorly; postocular prominences about one-half size of eyes. Labrum emarginate-truncate. Palpi with apical joint slender, swollen in middle, narrowed to apex, truncate (of labial strongly arcuate on external side). Prothorax transverse (3 × 3·3 mm.), widest rather before middle, declivous to base; sides strongly rounded; anterior margin truncate; anterior angles not marked, projecting a little from head; basal angles rectangular (hardly obtuse); border narrow, not sinuate before base, entire on base; median line strongly impressed; a transverse impression a little before base. Elytra widely oval (5·2 × 3·8 mm.), convex, lævigate (sometimes faint traces of striæ on disc, probably a post mortem effect); base wide, gently but decidedly and evenly

The large head and the prothorax wider than usual in comparison with the elytra are marked features in this species and are especially noticeable in the ♂.

31. P. LEAI, n.sp.

♀. Oval, convex; head large; prothorax transverse, bordered on base; elytra widely oval, obsoletely striate near suture; metasternum with episterna short (subquadrate), epimera short—about twice as broad as long. Black, shining; upper surface obscurely bronzed; tibiæ piceous; antennæ, palpi and tarsi piceous-red.

Head large, wide at base, convex; clypeal suture distinct, lightly impressed; clypeus emarginate; eyes round, convex, prominent; orbits swollen behind eyes; postocular prominences sharply raised posteriorly, about half size of eyes; space between eye and subocular ridge wider than eye. Labrum widely and lightly emarginate. Palpi with apical joint long, slender, lightly dilatate in middle, truncate. Prothorax broader than long (3·5 × 3·9 mm.), convex (a little depressed on disc), widest just behind anterior marginal puncture; sides lightly rounded, strongly narrowed posteriorly, lightly narrowed anteriorly; anterior margin truncate; anterior angles not marked, hardly projecting from head; basal angles almost rectangular (very lightly obtuse); border narrow, not sinuate before base, entire on base; median line strongly impressed; a well marked transverse impression a little in front of base. Elytra wide, oval (7 × 5·25 mm.), convex (hardly depressed on disc), widest about middle; sides strongly rounded; shoulders wide, roundly narrowed to peduncle (obsoletely striate on disc). Prosternum roundly and strongly acclivous to anterior margin. Ventral segments roundly foveate on each side. Legs light; posterior trochanters reniform, short; posterior tarsi with apical joint narrowed to base.

Length 13, breadth 5·25 mm.

Hab.—Newcastle (Lea, one example).

This species has more resemblance to *P. blackburni*, Sl., than to any other described species; it is, however, a larger species

with head larger, postocular prominences more developed, prothorax less dilatate on sides, metasternal episterna and epimera shorter. It shows an evident natural affinity to *P. ovipennis*, Sl., therefore I expect the ♂ will prove to have the basal joints of the four anterior tarsi without spongiose tissue beneath. The specimen before me shows evidence of a lengthened immersion in alcohol, and for this reason I believe the elytra are naturally lævigate.

32. P. ANGULICEPS, n.sp.

♀. Elliptic-oval, subcylindrical, lævigate; head with posterior angle of outer margin of buccal fissure prominent, obtuse (subrectangular); prothorax convex, strongly angustate posteriorly, bordered on base; elytra oval, convex (7·5 × 5 mm.); posterior trochanters pointed at apex. Shining, upper surface bronzed-black—tending to greenish-black in middle; under surface rather piceous with bronzy metallic reflections on posterior ventral segments; legs piceous-black with metallic tinge on femora; antennæ, tarsi and palpi reddish-brown.

Head ordinary; vertex convex, not transversely impressed; eyes round, convex, prominent; orbits lightly swollen behind eyes. Prothorax nearly as long as broad (3·8 × 3·85 mm.), convex, declivous to base; sides strongly rounded; anterior margin widely emarginate in middle; anterior angles obtuse, not marked, projecting considerably from head; base truncate; basal angles almost rectangular; border narrow, not sinuate before base, entire

buccal fissure equally wide with similar posterior angles, and I should expect the same form to occur in *P. distinctus*, Sl., the only other nearly allied species. It should be noted that I have seen no undoubtedly male specimen belonging to the small group which these three species constitute, for the type specimen of *P. ambiguus* proves to be the ♀, and not the ♂ as I thought, and I did not determine the sex of the type specimens of *P. distinctus*.

Note.—In the type specimen of *P. ambiguus* there is a strongly impressed round fovea on the apical dilatation of the inflexed margin of the pronotum; this does not occur in *P. anguliceps*.

Tribe *HARPALINI*.

The classification of the Harpalini is perhaps the most difficult to elucidate of all the tribes among the Carabidæ,* and it appears to me that the complexity of the subject has been increased by systematists having placed so much reliance for classificatory purposes on the secondary sexual characters of the male, particularly the vesture beneath the joints of the tarsi. Although the vesture of the under side of the tarsi is useful in helping to determine the affinities of species, and often of genera, being usually similar throughout each tribe, yet, in the classification of the Harpalini its use has been pushed to lengths that have added to the complication of the subject rather than diminished its intricacy; so much is this the case that it seems impossible, under the existing system, to refer a Harpalid of which the male is unknown with any certainty to its proper genus, or even to determine the group of genera into which it should fall. Any classification which is founded on secondary sexual characters seems to me to be so artificial that an attempt to replace it is always worth trying; therefore I offer the following table (though aware it is far from perfect) in the hope that by its aid the limits of the genera among the Australian Harpalini may be more accurately defined than seems to be the case at present.

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* *Vide* Dr. G. H. Horn's remarks, Trans. Am. Ent. Soc. 1881, ix. p. 175.

Table of Genera.

A. Eyes widely separated from mouth beneath.
  B. Elytra fully striate. (Penultimate joint of labial palpi with more than two setæ in front).
    C. Posterior tarsi long (joints usually linear); first joint as long as or longer than two succeeding joints together..... } GNATHAPHANUS. DIAPHOROMERUS.
    CC. Posterior tarsi short; joints short and incrassate to apex, apical angles with long spinous setæ, first joint not, or very little, longer than second (never as long as two succeeding together).
      D. Sinus of mentum with a median tooth..... } PHORTICOSOMUS. HYPHARPAX.
      DD. Sinus of mentum edentate..... CENOGMUS.
  BB. Elytra with eighth stria obsolete on sides.
    E. Form stout, convex; size moderate..... HARPLANES.
    EE. Form narrow, depressed; size small..... THENAROTIDIUS.
AA. Eyes very close to buccal fissure beneath. (Penultimate joint of labial palpi with two setæ in front).
  F. Mandibles hardly projecting beyond labrum, not decussating.
    G. Elytra with striæ obsolete on sides, eighth not impressed on sides..... NOTOPHILUS.
    GG. Elytra fully striate (eighth impressed for whole length)..... STENOLOPHUS.
  FF. Mandibles projecting beyond labrum, acute, decussating; front obliquely

Of the genera given in Mr. G. Masters' Catalogue of the Australian Coleoptera as belonging to the Harpalini, but not included in this table, *Geobænus*, *Acupalpus* and *Harpalus* should, I think, be deleted from the Australian fauna, there not being sufficient evidence that any of the species attributed to these genera properly belong to them; though I cannot at present suggest the true position of the species which are still left therein. *Anisodactylus*, properly speaking, does not appear to be represented in Australia; I therefore propose the genus *Cenogmus* for the reception of the species referred to it by Baron Chaudoir. The single species of *Microsarus* has been shown by the Rev. T. Blackburn to be synonymous with *Gnathaphanus adelaidæ*, Casteln. *Nebriosoma*, another genus with a single species, is not a Harpalid; I have seen the type specimen of *N. fallax*, Casteln., in the Howitt Collection, and have noted that the episterna of the mesosternum reach the coxæ, so that the genus belongs to the first division of the Carabidæ; its place is apparently in the antarctic tribe Migadopini, a position indicated by de Castelnau, who regarded it as closely allied to *Loxomerus* (= *Heterodactylus*) from the Auckland Islands (not from New Zealand as said by de Castelnau). *Cyclothorax* does not belong to the Harpalini. *Veradia*, a genus placed by its founder, Count de Castelnau, in the Morionini, requires notice. Chaudoir has said that it does not differ from *Hypharpax*;* I have seen a type specimen of the single species, *V. brisbanensis*, Casteln., in the Howitt Collection, and I agree with Chaudoir that it is a Harpalid, but not having examined it critically cannot pronounce on its relationship to the other Australian Harpalids, though I should think Chaudoir might be followed in his assignment of it to *Hypharpax*. It may be as well to note here that I believe *Amblygnathus minutus*, Casteln., to be a Harpalid, but not knowing it in nature cannot venture any suggestion as to its place among the Australian Harpalini.

* Bull. Mosc. 1880, lv. p. 318.

Genus GNATHAPHANUS.

33. GN. RECTANGULUS, Chaud.; l.c. Sp. 665. *Hab.*—Upper Ord and Behn Rivers (Helms).

34. GN. SULCATULUS, Macl.; l.c. Supp. Sp. 7453. *Hab.*—Upper Ord River (Helms).

I have examined the types of *Diaphoromerus sulcatulus*, Macl., and *D. sexpunctatus*, Macl., in the Macleay Museum and found them identical. I adopt *sulcatulus* as the preferable name, and place the species in the genus *Gnathaphanus* because it has the third interstice of the elytra pluripunctate; it is allied to *Gn. adelaidæ*, Casteln.

35. GN. ADELAIDÆ, Casteln.; l.c. Sp. 656. *Hab.*—Swan River, Pinjarrah, Mount Barker, Bunbury (Lea).

Genus DIAPHOROMERUS.

I do not know characters by which this genus can be satisfactorily defined and divided from *Gnathaphanus;* the differences in the shape of the paraglossæ are not likely to be of much value, and that seems to have been the sole feature on which Baron Chaudoir relied to separate these genera.* The two following species are left in *Diaphoromerus* by me only because they have been placed there by Chaudoir.

36. D. INÆQUALIPENNIS, Casteln.; l.c. Sp. 684. *Hab.*—Swan River, Darling Ranges, Mount Barker (Lea).

37. D. SCULPTIPENNIS, Casteln.; l.c. Sp. 698. *Hab.*—Rottnest

cosomus—which have (*a*) the penultimate joint of the labial palps with more than two setæ in front, (*b*) the mentum with a tooth in the sinus, and (*c*) the posterior tarsi short, yet I am doubtful whether *H. bostocki*, Casteln., *H. dampieri*, Casteln., and *H. ranula*, Casteln., can strictly speaking be considered as belonging to the same genus as *H. kreffti*, Casteln., *H. inornatus*, Germ., and *H. kingi*, Casteln., which are typical species of the genus. As a result of extending the limits of the genus *Hypharpax* to include those species having in combination the characters mentioned above, I have been unable to tabulate the differences between that genus and *Phorticosomus;* normally the species of *Hypharpax* have the derm of the elytra shagreened, while the species of *Phorticosomus* have not, unless slightly near the lateral margin; *Harpalus dampieri*, Casteln., *H. ranula*, Casteln., and *H. bostocki*, Casteln., are as far as I know, the only species at present included in *Hypharpax* which have the disc of the elytra not shagreened, but otherwise these three species do not appear to have much affinity towards one another. It may be noted that, as far as my observations go, the third joint of the antennæ in *Hypharpax* is so sparsely setose (and then only near the apex), that it resembles the second joint more than the fourth, and may without inaccuracy be called glabrous, while in the other genera (excepting *Phorticosomus*) the third joint is hirsute, except near the base, after the manner of the succeeding joints, though to a less degree.

38. H. KREFFTI, Casteln.; l.c. Sp. 701. *Hab.*—Wyndham (Helms).

39. H. KINGI, Casteln.; l.c. Sp. 700. *Hab.*—Pinjarrah, Mount Barker, Bunbury (Lea).

40. H. SCULPTURALIS, Casteln.; l.c. Sp. 697. *Hab.*—Swan River, Rottnest Island, Darling Ranges, Mount Barker (Lea).

41. H. ÆREUS, Dej.; l.c. Sp. 671. *Hab.*—Swan River, Rottnest Island, Darling Ranges (Lea), Albany (Helms).

42. H. BOSTOCKI, Casteln.; l.c. Sp. 676. *Hab.*—Rottnest Island (Lea).

43. H. DAMPIERI, Casteln.; l.c. Sp. 677. *Hab.*—Newcastle, Beverley, Pinjarrah (Lea).

44. H. RANULA, Casteln.; l.c. Sp. 694. *Hab.*—Donnybrook (Lea).

45. H. PUNCTICOLLIS, Macl.; l.c. Supp. Sp. 7479. *Hab.*—Upper Ord River (Helms).

Though placed by Sir William Macleay in the genus *Harpalus*, it does not belong to it, as is sufficiently shown by the labial palps having the penultimate joint with more than two setæ in front. Its short posterior tarsi indicate its position pretty clearly.

46. H. sp.? ♂. A single specimen of a species with testaceous tibiæ allied to *H. deyrollei*, Casteln., but differing from that species by its wider and more convex shape, the puncture of the third interstice of the elytra placed nearer the apex, &c. The posterior femora are not dentate on the underside, and the posterior tibiæ are strongly arcuate. It is evidently an undescribed species, but I am not prepared to describe it on the single specimen before me.

Hab.—Beverley (Lea).

CENOGMUS, n.gen.

I propose this genus to receive *Harpalus rotundicollis*, Casteln., *H. waterhousei*, Casteln., and *Anisodactylus opacipennis*, Chaud. The remarks of both Baron Chaudoir and Mr. Blackburn on these species suggest the necessity of a new genus, which can be readily identified in the Australian fauna by the characters allotted to it

from Victoria, though a specimen is in my collection labelled "Victoria." but on what authority I do not know; my not having seen it from near Melbourne is no evidence that it does not occur there.

THENAROTIDIUS, n.gen.

Head smooth, front not impressed. Eyes round, convex, coarsely faceted, distant from buccal fissure beneath.

Mandibles short, stout.

Ligula small, narrowed to apex, corneous; apex obtuse, bisetose; paraglossæ membranous, wide, subquadrate, extending considerably in front of ligula, connate in front of ligula.

Mentum concave; sinus bordered, oblique on each side, evenly rounded (edentate) in middle.

Palpi: maxillary with apical joint fusiform, longer than penultimate; labial short, stout, two terminal joints of equal length, apical joint thick, obtuse at apex, finely and sparsely setose.

Prothorax transverse, not impressed or punctate on each side of base; marginal setigerous puncture rather large, placed about middle of length.

Elytra lightly striate; eighth stria obsolete in middle; interstices shagreened and finely punctate, third finely unipunctate about apical fifth.

Metasternum with episterna narrow, elongate.

Legs light: ♂ with four anterior tarsi lightly dilatate, four basal joints densely clothed with spongiose tissue beneath. Posterior tarsi linear, hardly as long as tibiæ, first joint nearly as long as two succeeding ones together.

Apterous: body shortly pedunculate; upper surface shagreened.

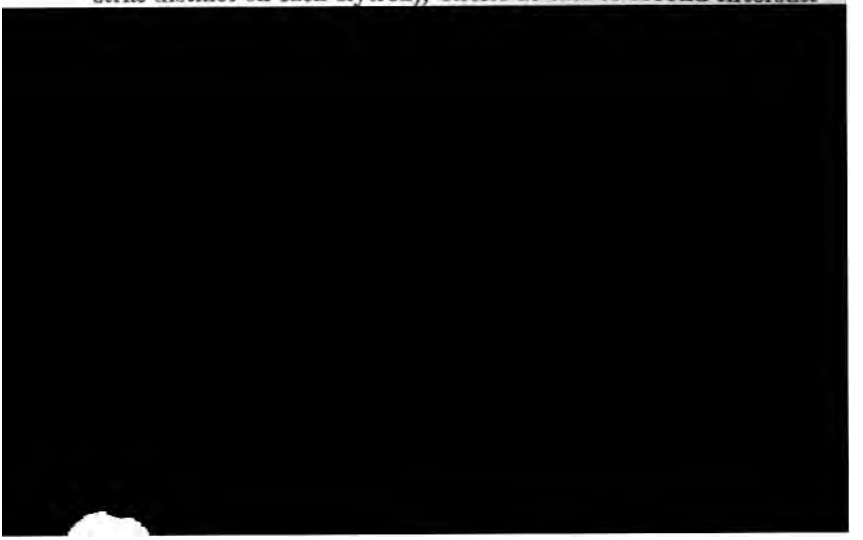
The type of this genus is *Th. gagatinus*, Macl., a species which was described as belonging to the genus *Bembidium;* it is common in many parts of N.S. Wales. *Thenarotidius* may be readily recognised among the Australian Harpalids by its narrow depressed form, coal-black colour and eyes distant from mouth beneath. The penultimate joint of the labial palps appears to have only two setæ in front, but a careful examination of the palps removed

from the head seemed to indicate the presence of one or two more fine setæ. I have therefore refrained from alluding to the sets of this joint in the diagnosis of the genus, but in any case the affinity of the genus is to those with bisetigerous palpi, its position being apparently between *Harpalus* and *Notophilus*.

50. TH. ANTHRACINUS, n.sp.

Elongate, subdepressed; head large; prothorax transverse, apex and base of about equal width; elytra subtruncate, not attaining apex of abdomen, finely striate. Black, subopaque; legs piceous or piceous-black, tibiæ sometimes brownish-testaceous except at apex; antennæ fuscous, with basal joint brownish-testaceous.

Head wide at base, convex, finely shagreened and minutely punctate; clypeal suture finely impressed; clypeus bordered. Labrum transverse, truncate, shagreened and finely punctate. Prothorax transverse (1 × 13 mm.), finely shagreened and minutely punctate; sides lightly rounded; anterior margin very lightly emarginate; anterior angles obtusely rounded; posterior angles widely rounded, not marked; base lightly arcuate, obsoletely sinuate on each side of peduncle; border reflexed, entire on base, passing round anterior angles on to sides of anterior margin; median line hardly impressed (perceptible on disc). Prosternum finely bordered on anterior margin. Elytra truncate-oval, widest a little behind middle, very lightly declivous to apex; sides very lightly rounded; apex arcuate-truncate; striæ fine, distinct on disc, obsolete near sides (six inner striæ distinct on each elytron); striole at base of second interstice



behind the shoulders, the base less squarely truncate, the humeral angles wider; the colour a deeper black, &c.

Genus NOTOPHILUS.

51. N. GRACILIS, Blkb.; l.c. Supp. Sp. 7465. *Hab.*—Beverley, Darling Ranges, Pinjarrah, Bunbury (Lea).

52. N. OBLIQUUS, n.sp.

Alate, elliptical; dorsal surface depressed, minutely shagreened; prothorax broader than long, obliquely narrowed to base, hardly wider across base than apex, bordered on whole circumference; elytra finely striate, striæ obsolete on sides, third interstice unipunctate a little in front of apical declivity. Black, shining, basal joint of antennæ testaceous.

Head large (not short), smooth; frontal impressions feebly impressed (nearly obsolete); lateral punctures of clypeus large; eyes convex, not prominent. Prothorax lightly transverse (0·7 × 0·9 mm.), widest before the middle (at marginal seta); sides lightly rounded anteriorly, oblique posteriorly; apex truncate (hardly emarginate); anterior angles rounded, not advanced; basal angles obtuse, lightly marked; base lightly bisinuate, arcuate in middle, a little oblique at each side; border lightly reflexed on sides, very fine on middle of base and apex; a wide transverse impression a little before the base terminating on each side in a shallow rounded depression; a shallow arcuate impression across anterior part of disc; median line obsolete. Elytra wider than prothorax (2·1 × 1·3 mm.), widest behind middle, depressed on disc; base much wider than base of prothorax; humeral angles rounded; sides lightly rounded; apex shortly arcuate, widely subsinuate on each side; striæ shallow, all marked at apex, only four inner ones marked on disc, eighth obsolete on sides; ninth interstice wide at apex, punctate near shoulders and apex; border narrowly reflexed.

Length 3 3, breadth 1·3 mm.

Hab.—Geraldton (Lea, one specimen).

From *N. niger*, Blkb., *N. gracilis*, Blkb., and presumably from *N. parvus*, Blkb., the species it resembles in colour, it differs by the form of the posterior angles of the prothorax which, though obtuse, are decidedly marked, instead of being rounded off. It is the largest species of the genus yet described, and is more elongate than the others; compared with *N. niger* and *N. gracilis* the prothorax is less transverse and more narrowed to the base, and the elytra more decidedly striate. Obsolete traces of a striole are noticeable under a lens at the base of the second interstice.

Genus STENOLOPHUS.

53. S. DINGO, Casteln.; l.c. Sp. 731. *Hab.*—Mount Barker, Donnybrook, Darling Ranges, Geraldton and Mullewa (Les); Upper Ord River (Helms).

S. dingo (of which *S. politus*, Macl., is—as noted by Mr. G. Masters, Cat. Supp. p. 37—a synonym) seems to range over the whole of Australia. I believe it will be found that *S. dingo*, Casteln., is synonymous with *Harpalus vestigialis*, Erichs., with the description of which it seems to agree so closely that it is only the fact of my not having seen it from Tasmania that prevents my placing it under that species.

Genus LECANOMERUS.

54. L. RECTICOLLIS, Macl.; l.c. Supp. Sp. 7480. *Hab.*—Upper Ord River (Helms).

punctate a little behind middle. Piceous-black, ♂ nitid, ♀ with elytra subnitid (hardly opaque); vertex, middle of base of prothorax and sterna reddish; prothorax with narrow ferruginous margin; elytra with light brownish margin; antennæ fusco-ferruginous, basal joint testaceous; coxæ, tibiæ and tarsi darker.

Head convex, cylindrical behind eyes, lævigate; frontal impressions obliquely divergent backwards to near middle of eyes, short, well marked; eyes convex, prominent. Labrum transverse-quadrate, shagreened. Prothorax a little broader than long (1·5 × 1·75 mm.), depressed, declivous on anterior part of sides, widest before middle (at marginal seta); sides lightly rounded, roundly and decidedly narrowed anteriorly, gently narrowed posteriorly; basal angles widely rounded, not the least marked; apex lightly emarginate; anterior angles obtuse, lightly marked; border narrow, extending round anterior angles a little on to anterior margin on each side, and on each side of base to peduncle; lateral channel not impressed; a wide shallow impunctate depression on each side of base. Elytra convex, ovate (3·8 × 2·5 mm.); base a little wider than base of prothorax, truncate; humeral angles rounded; sides strongly, shortly and roundly narrowed to base; apical curve with a light sinuosity on each side at extremity of eighth stria; striæ distinctly impressed, a little stronger in ♂ than in ♀; ninth interstice becoming wide near apex, its punctures widely interrupted on anterior half and placed in two groups on posterior part (four near apex and three a little further forward); border narrow, reflexed.

Length 5-6, breadth 2-2·7 mm.

Hab.—Swan River, Darling Ranges, Pinjarrah, Donnybrook, Mount Barker (Lea), Albany (Helms).

This is evidently a common species in West Australia. Compared with a Victorian species, found near Melbourne, which is allied to, if not identical with, *Harpalus verticalis*, Erichs., and also allied to *L. flavocinctus*, Blkb., it differs by having the prothorax less transverse, and the apex of the elytra less strongly sinuate on each side, the ♀ with the elytra much more finely shagreened and not sericeous, &c. It evidently differs from *L*

flavocinctus and *L. obscurus*, Blkb., by having the prothorax less transverse; apparently it is closely allied to *L. lindi*, Blkb., but has the margin of the elytra (including the posterior half of the ninth interstice, and the eighth near the apex) lightly coloured. It is characteristic of *Lecanomerus* to have three punctures on the ninth interstice placed a little before those near the apex.

Genus THENAROTES.

56. TH. BRUNNICOLOR, n.sp.

Alate, rather robust, not shagreened; head lightly biimpressed, mandibles short, projecting beyond labrum, mentum lightly emarginate, edentate; antennæ inserted very near eyes, two basal joints glabrous; prothorax transverse, base hardly wider than apex, a wide depressed finely punctate space on each side near basal angle; elytra fully striate, interstices lightly convex, second striolate at base, third unipunctate about posterior third; posterior tarsi with first joint about as long as two succeeding joints together. Prothorax and elytra brownish—elytra darker than prothorax; head black; antennæ fuscous, two basal joints testaceous; under surface ferruginous-piceous; legs testaceous.

Head wide, convex, minutely shagreened; frontal impressions short, rather wide, oblique; lateral border lightly sinuate above anterior part of eyes; clypeal suture linear; eyes large, prominent, globular, lightly enclosed at base. Prothorax transverse (0·8 × 1·1 mm.), widest before the middle; disc lightly convex, a

curve short; striæ strongly impressed, eighth well marked in all its course; interstices a little convex, becoming narrow and decidedly convex towards apex, second wider near base and with a well marked basal striole rising from base of second stria, ninth narrower than eighth in middle of length, wider towards apex; lateral border reflexed.

Length 3·7, breadth 1·5 mm.

Hab.—Behn River (Helms).

Differs from the other species of *Thenarotes* by having a well marked striole at base of second interstice of elytra. Its facies is that of *Thenarotes*, but perhaps it is not in its proper place in that genus, though it does not come into any other Australian genus. The characters that define the genus *Thenarotes* are a little doubtful; the type (*T. tasmanicus*, Bates) is fully striate and has the mentum toothed in the sinus; *Th. australis*, Blkb., has the elytra with the striæ obsolete on the sides, the mentum edentate and the ♂ without spongiose tissue beneath any joints of the four anterior tarsi. *Th. brunnicolor* has the mentum edentate but the elytra fully striate (the tarsal vesture of the ♂ unknown). Perhaps the characters of the genus may vary sufficiently to include all these differences, in which case *Th. tasmanicus*, *Th. australis* and *Th. brunnicolor* would represent three groups in the genus, but it may be found necessary, when the classification of these and allied Harpalids is fully worked up, to place each of these species in a separate genus.

Note.—Only that the basal angles of *Th. brunnicolor* are widely rounded, the sides would meet the base almost at right angles.

Genus EUTHENARUS.

This New Zealand genus is represented in Australia, and at least one species, viz., *E. (Acupalpus) morganensis*, Blkb., has been described. I have compared *Acupalpus morganensis* with *E. brevicollis*, Bates, and *E. puncticollis*, Bates, the New Zealand species for which Mr. Bates founded the genus, and have found it congeneric with them.

57. E. COMES, n.sp.

Elongate-oval, shining (not shagreened), lightly convex; front obliquely biimpressed; prothorax a little broader than long evidently wider across base than apex, punctate on each side of base, marginal setigerous puncture small and placed about anterior fourth; elytra truncate-oval, fully striate, second interstice without striole at base third interstice unipunctate near posterior third; tarsi short, posterior with joints short. Piceous-black, shining; lateral border of prothorax and lateral border and suture (posteriorly) of elytra brownish-testaceous; legs testaceous, coxæ, tibiæ and tarsi slightly infuscate; antennæ dark fuscous, basal joint testaceous.

Head lævigate; frontal impressions extending obliquely backwards to near middle of eyes, rather strongly impressed; eyes convex, not very prominent. Prothorax broader than long (1·15 × 1·3 mm.), widest before middle, lævigate excepting a slightly depressed punctate area near each basal angle (these punctate spaces sometimes nearly meeting in middle); sides lightly rounded anteriorly, obliquely and lightly narrowed posteriorly; anterior margin hardly emarginate; anterior angles lightly marked; base truncate, sloping obliquely forward a little on each side; basal angles obtuse but marked (not rounded); border rather thick, passing round basal angles on to base as far as peduncle on each side; median line lightly marked. Elytra much wider than prothorax (2·6 × 1·7 mm.), convex, strongly

puncturation on each side of the base more dense, covering a greater space and not placed in such deep or well defined depressions; elytra more strongly declivous to apex. In *E. morganensis* and *E. comes* the males have the vesture of the under side of the four anterior tarsi as in *E. brevicollis*, Bates, and agree with that species in having a fovea in the middle of the abdomen just behind the metasternum.

Tribe *CHLÆNIININI.*

Group **Oodides.**

Genus ODES.

58. O. IMPRESSUS, Chaud.; l.c. Sp. 568. *Hab.*—Beverley, Rottnest Island (Lea).

59. O. OBLONGUS, Casteln.; l.c. Sp. 572. *Hab.*—Behn River (Helms).

Genus COPTOCARPUS.

60. C. CONVEXUS, Casteln.; l.c. Sp. 557. *Hab.*—Swan River, Beverley, Newcastle, Mount Barker (Lea).

61. C. GIBBUS, Chaud.; l.c. Sp. 558. *Hab.*—Mount Barker, Bunbury (Lea); Albany (Helms).

Tribe *BRACHYNINI.*

Genus PHEROPSOPHUS.

62. PH. VERTICALIS, Dej.; l.c. Sp. 102. *Hab.*—Behn River (Helms).

Division **Harpalinæ bisetosæ.**

Tribe *PANAGÆINI.*

Genus EPICOSMUS.

63. E. NOBILIS, Macl.; l.c. Supp. Sp. 7399. *Hab.*—Behn River (Helms).

64. E. PARVULUS, Macl.; l.c. Sp. 7400. *Hab.*—Behn River (Helms).

Tribe *NOMIINI*.

This tribe was founded by Dr. G. H. Horn on the single genus *Nomius* (Trans. Am. Ent. Soc. ix. 1881, p. 129). It is evident from his remarks that he felt unable to define the tribe fully from want of sufficient data, and therefore restricted his diagnosis to the genus *Nomius*. The three genera known to him as apparently belonging to the Nomiini were *Nomius*, *Melænus* and *Coscinia*, and these seemed to him to represent three groups in the tribe. I do not know any of these genera, but would place here all the genera presenting a combination of the following characters:—

Mandibles with a setigerous puncture in the scrobe; palpi with last joint not subulate; elytra with margin interrupted posteriorly and with an internal plica.

As thus constituted the Nomiini will contain ten Australian genera, which may be divided into four groups as shown in the following table:—

A. Elytra not bordered on base..... Group MEONIDES.

b. Antennæ filiform, front without lateral carinæ, prothorax with two marginal setæ, elytra deeply and simply striate on disc. .... Genus MEONIS.

bb. Antennæ moniliform, front with a ridge on each side, prothorax with lateral channel plurisetose, elytra punctate-striate on disc..... Genus LACCOCENUS.

g. Elytra impunctate on third interstice and without a striole at base of first..... Genus TROPOPTERUS.

gg. Elytra with third interstice punctate and first striolate at base..... Genus CYCLOTHORAX.

FF. Mesosternum very narrow between coxæ, apex deeply triangularly excised (ninth interstice of elytra very narrow)..... Group AMBLYTELIDES.

h. Penultimate joint of tarsi not bilobed..... Genus EPILYX.

hh. Penultimate joint of tarsi bilobed.

i. Prothorax with two marginal setæ on each side... ..... Genus AMBLYTELUS.

ii. Prothorax with one marginal seta on each side (at basal angle)..... ... Genus DYSTRICHOTHORAX.

Notes on the preceding table.—As I have no example of any of de Castelnau's species of the genus *Teraphis*, it is possible the tabulation given of the Melisoderides may be so defective as to be of little use, for the seventh stria may not be obsolete in the typical species of *Teraphis*, though it is so in *T. (Drimostoma) helmsi*, Sl., the only species of the genus I have.

De Castelnau's genera *Moriodema* and *Moriomorpha* seem not sufficiently distinct to be kept separate, and *Moriodema* is congeneric with *Melisodera*; therefore both have to fall out of the list of Australian genera.

Drimostoma striato-punctata, Casteln., the type of which I have seen in the Howitt Collection at the Melbourne University, is congeneric with the species from New Zealand, which Mr. Bates referred to the Chilian genus *Tropopterus*, and Mr. Bates was wrong in suspecting it to be identical with *Cyclothorax insularis*,

Mots * *Drimostoma australis*, Casteln., *D. montana*, Casteln., and *D. alpestris*, Casteln., seem to me to be species of *Tropopterus*, so that genus must now be considered as belonging also to the Australian fauna. *D. thouzeti*, Casteln., and *D. vicina*, Casteln., are species of *Abacetus* I believe. *D. tasmanicus*, Casteln., I do not know. *D. antarctica*, Casteln., (type in Howitt Coll.), is doubtless a species of *Tropopterus*. In the tabulation of the group Amblytelides, I have followed the Rev. Thos. Blackburn.†

Genus CYCLOTHORAX.

65. C. AMBIGUUS, Erichs.; l.c. Sp. 923. *Hab.*—Swan River, Beverley, Pinjarrah, Bunbury, Donnybrook, Geraldton (Lea); Albany (Helms).

66. C. FORTIS, Blkb.; l.c. Supp. Sp. 7488. *Hab.*— Beverley (Lea).

67. C. BLACKBURNI, n.sp.

Narrow, convex; prothorax suborbiculate, sinuate-angustate posteriorly, basal angles sharply retangular, basal puncturation coarse; elytra strongly punctate-striate, lævigate towards apex and on lateral declivities. Black, nitid; femora ferruginous, tibiæ, tarsi and antennæ infuscate.

Head lævigate, convex, frontal impressions deep, rather wide, sinuate (parallel anteriorly, divergent posteriorly); eyes round, prominent. Prothorax hardly broader than long (1 × 1·1 mm.), convex; sides rotundate, strongly sinuate at posterior fifth, meeting

impressed, ending in a foveiform depression posteriorly. Elytra much wider than prothorax (2·5 × 1·6 mm.), subparallel on sides, convex, declivous to base, strongly declivous to sides; base widely rounded and a little advanced on each side of peduncle; six inner striæ on each elytron strongly marked, coarsely and closely punctate, first reaching apex, others hardly extending on to apical declivity, seventh indicated under a lens by a few fine nearly obsolete punctures; striole at base of first interstice elongate, as strongly punctate as the striæ; third interstice bipunctate on disc; lateral interstice narrow, seriate-punctate; border reflexed on sides, extending round humeral angles but not reaching peduncle; basal border obsolete.

Length 4, breadth 1·6 mm.

Hab.—Pinjarrah (Lea, unique).

Allied to *C. eyrensis*, Blkb. I have submitted the type specimen to Mr. Blackburn for inspection, and he informs me that it is nearest *C. eyrensis*, but "differently coloured, and with the prothorax notably narrower."

Note.—The episterna of the metasternum are punctate, and probably more of the under surface as well, but, not having detached the specimen before me from the card to which it is gummed, the episterna only have been clearly seen.

Genus AMBLYTELUS.

68. A. BREVIS, Blkb.; l.c. Supp. Sp. 7499. *Hab.*—Mount Barker (Lea).

The single specimen of this species agrees with a specimen of *A. brevis* sent to me by Mr. Blackburn in every way, except that the fifth interstice of the elytra is without a series of punctures, and the basal angles of the prothorax are a little less obtuse, but these differences seem too slight for it to be considered as even a variety.

69. A. LEAI, n.sp.

Robust, convex; head constricted to a neck behind eyes; prothorax subcordate (truncate at apex and base), about as wide between posterior angles as between anterior angles, basal angles

obtuse; elytra lightly convex, declivous to base, crenulate-striate, interstices depressed, third, fifth and ninth seriate-punctate. Nitid, ferruginous-brown; elytra infuscate towards sides and apex; under surface reddish becoming darker towards sides and apex of abdomen; femora testaceous (not pale); tibiæ, tarsi and antennæ clear reddish-brown.

Head lævigate, convex between eyes, strongly constricted and transversely impressed behind eyes; front biimpressed, the impressions wide, parallel; eyes convex, prominent, truncate at base; postocular processes two-thirds length of eyes, obliquely narrowed to neck. Prothorax lightly transverse (1·9 × 2·25 mm.), convex, widest before middle; sides rounded; anterior angles widely rounded; lateral margins explanate, narrower and very lightly advanced at anterior angles, gently roundly-obliquely terminated at base behind posterior marginal setigerous puncture; apex and base finely bordered; median line well marked; a wide shallow impression near each basal angle; basal part of prothorax feebly depressed between these impressions. Elytra ovate (6 × 3·8 mm.), convex; basal border extending laterally to width of base of prothorax, arcuate posteriorly, meeting lateral border in a lightly marked angle; apical curve decidedly sinuate on each side at extremity of ninth interstice; eighth interstice wide on sides, narrow and carinate near apex; lateral margin explanate (not wide).

Length 9-10, breadth 3·5-3·9 mm.

70. A. BRUNNICOLOR, n sp.

Robust, lightly convex; head constricted to a neck behind eyes; prothorax suborbiculate, hardly wider between posterior than between anterior angles, posterior angles widely obtuse; elytra lightly convex, declivous to base, punctulate-striate; interstices depressed, third, fifth and seventh seriate-striate. Ferruginous-brown; elytra infuscate towards apex and sides, lateral margins of a light ferruginous colour, middle of body beneath and femora ferruginous.

Head lævigate, wide at eyes, transversely impressed across occiput; vertex lightly convex; front lightly and widely biimpressed; eyes globose, prominent, lightly enclosed at base; post-ocular processes not protuberant, about half the length of eyes, decidedly and obliquely narrowed to neck. Prothorax lævigate, transverse (1·4 × 2 mm.), convex, widest a little before middle; sides rotundate; apex truncate between angles; base arcuate-truncate; anterior angles widely rounded; lateral margins explanate, hardly advanced at anterior angles, sloping roundly to base behind posterior setigerous puncture; median line lightly impressed; basal part of prothorax depressed; elytra ovate (5·7 × 3 5 mm.); basal border extending laterally to width of base of prothorax with margins, its point of junction with lateral border marked but not angulate; apical curve lightly sinuate on each side.

Length 7·7-8·7, breadth 2·9-3·5 mm.

Hab.—Geraldton and Mullewa (Lea).

Very closely resembling *A. leai*, Sl., with which it is almost identical in colour, and from which it does not differ in any feature of importance. I have regarded it as a distinct species on account of the following differences:—Eyes a little more prominent; orbits smaller and less swollen behind eyes; prothorax more transverse, more strongly and evenly rounded on sides, the lateral margins more widely explanate and terminating more abruptly and a little further in front of base—thus forming a more strongly marked juxta-basal sinuosity; elytra a little less

convex, apical curve more widely rounded and less strongly sinuate on each side, the humeral curve of the border more widely rounded, not angulate.

Tribe *BEMBIDIINI*.

Genus BEMBIDIUM.

71. B. JACKSONIENSE, Guér.; l.c Sp. 953. *Hab.*—Pinjarrah, Geraldton and Mullewa (Lea).

72. B. ERRANS, Blkb.; l.c. Supp Sp. 7575. *Hab.*—Beverley (Lea).

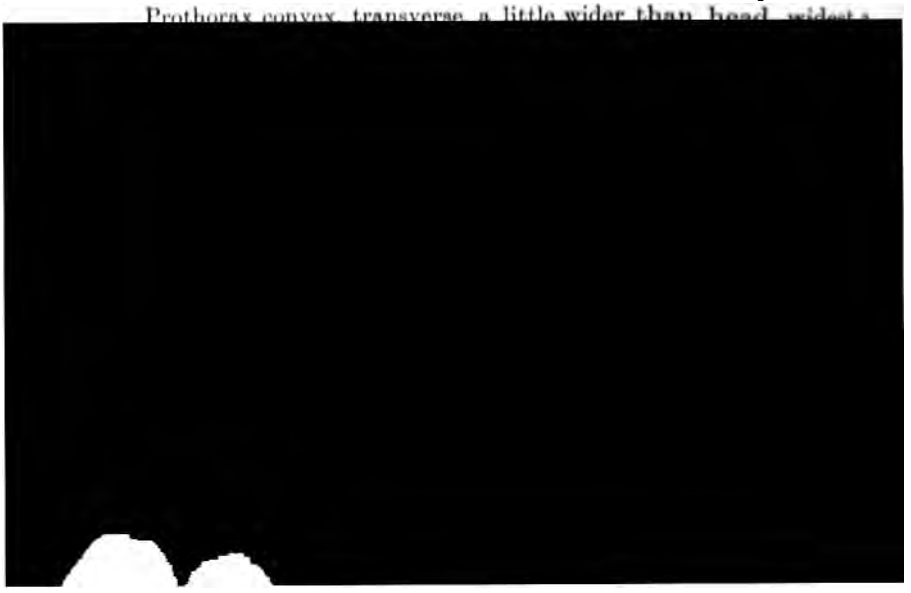
Genus TACHYS.

73. T. FROGGATTI, Sl., P.L.S.N.S.W. 1896, xxi. p. 362. *Hab.* —Upper Ord and Behn Rivers (Helms).

74. T. HELMSI, n.sp.

Robust, oval, convex; prothorax strongly rounded on sides, about as wide at base as at apex; elytra ovate, six inner striæ strongly impressed on each elytron, lateral stria and marginal channel strongly impressed, interstice between them convex, recurved stria of apex deeply impressed. Black with faint greenish tinge; elytra bimaculate about posterior third; maculæ, legs, antennæ and palpi testaceous.

Head wide, lightly and shortly biimpressed; eyes prominent. Prothorax convex, transverse, a little wider than head, widest a



1896, xxi. p. 357, it would be placed with *T. froggatti*, Sl., from which it differs by its larger size, more convex shape, prothorax more convex and more narrowed to base, &c. *T. buprestioides*, Sl., differs by having the elytra 4-maculate and the fifth stria reaching the base; *T. striolatus* is a smaller species with elytra 5-striate and 4-maculate; *T. bipustulatus*, Macl., has the prothorax less rounded on the sides and much wider across the base.

75. T. STRIOLATUS, Macl.; l.c. Sp. 958. *Hab.*—Behn River (Helms).

76. T. SPENCERI, Sl., Rept. Horn Scientific Exped., Zool. p. 380. *Hab* Behn and Upper Ord Rivers (Helms).

77. T. BISTRIATUS, Macl.; l.c. Sp. 948. *Hab.*—Upper Ord River (Helms).

78. T. FLINDERSI, Blkb.; l.c. Supp. Sp. 7564. *Hab.*—Swan River, Darling Ranges, Pinjarrah (Lea); Behn River (Helms).

79. T. HABITANS, Sl., P.L.S.N.S.W. 1896, xxi. p. 368. *Hab.*—Swan River, Darling Ranges, Pinjarrah, Bridgetown (Lea).

80. T. OVATUS, Macl.; l.c. Sp. 954. *Hab.*—Behn and Upper Ord Rivers (Helms).

81. T. UNIFORMIS, Blkb.; l.c. Supp Sp. 7572. *Hab.*—Beverley (Lea).

82. T. ATRICEPS, Macl.; l.c. Sp. 944. *Hab.*—Upper Ord River (Helms).

83. T. LINDI, Blkb.; l.c. Supp. Sp. 7566. *Hab.*—Swan River, Darling Ranges, Beverley (Lea); var. Upper Ord River (Helms).

Note.—*T. ectromioides*, Sl., P.L.S.N.S.W. 1896, xxi. p. 359, is probably not a West Australian species; the type specimen was sent to me by Mr. Lea from West Australia ticketed "Donnybrook, W.A.," but I have found specimens in the collection of the Agricultural Department of New South Wales marked "Richmond River (Lea)"; this makes me think that the original specimen had a wrong locality attached to it by some error.

Tribe *FERONINI.*

Genus NOTONOMUS.

84. N. MEDIOSULCATUS, Chaud.; l.c. Sp. 815; = *Adetipa punctata*, Casteln.; = *Omaseus occidentalis*, Casteln.; = *Omaseus satanus*, Casteln. (?) *Hab.*—Swan River, Pinjarrah, Donnybrook, Bridgetown (Lea).

Judging from the specimens sent to me by Mr. Lea, this species has a wide range in West Australia, and is very variable. Though I have not examined specimens from King George's Sound, and consequently have not identified *Omaseus satanus*, Casteln, with certainty, *N. mediosulcatus* seems to vary sufficiently to include it, and I have therefore (with just a little doubt) added it to the synonymy given by Baron Chaudoir.

The following varieties before me may be noted :—

A. ♂. Head and prothorax black, elytra greenish-metallic. Agrees with description of *N. mediosulcatus*. (Bridgetown).

B. ♀. Head and prothorax black, elytra obscurely purple; compared with "A" a little more convex, and with prothorax and elytra a little wider and more rounded on sides. Agrees with description of *Adetipa punctata*. (Bridgetown).

C. ♂. Black with very obscure purple reflections on elytra. (Swan River).

D. ♂. Wholly black. (Pinjarrah).

have given in P.L.S.N.S.W. 1894, (2), ix. p. 414: the position of these punctures in *Leptopodius* is—the two anterior on course of third stria, posterior on course of second stria.

87. L. IRIDIPENNIS, Casteln.; l.c. Sp. 883. *Hab.*—Bunbury, Bridgetown (Lea); Albany (Helms).

Genus CHLÆNIOIDIUS.

88. C. PROLIXA, Erichs.; l.c. Sp. 881. *Hab.*—Swan River, Beverley, Pinjarrah, Mount Barker (Lea).

Genus LOXANDRUS.

89. L. LONGIFORMIS, n.sp.

Narrow, elongate, dorsal surface depressed; head biimpressed; prothorax not wide, subcordate, not punctate near sides of base, base and apex of about equal width; elytra parallel on sides, strongly crenulate-striate, third interstice unipunctate about middle on course of second stria. Piceous or piceous-brown, legs reddish-piceous, antennæ ferruginous.

Head long; mandibles prominent; frontal impressions well marked, shallow, elongate-foveiform; eyes with posterior part of orbits reniform, rather prominent. Prothorax small (2 × 2·3 mm.), widest just behind anterior marginal puncture, smooth, depressed on disc, sides rounded (feebly subangulate at widest part), roundly narrowed to apex, more obliquely so to base; anterior margin emarginate; anterior angles marked, slightly prominent; base truncate; basal angles widely rounded; border narrow, reflexed on sides, not reaching middle of anterior margin; lateral channel canaliculate, well marked at basal angles; median line lightly impressed; lateral basal impressions long, deep; posterior marginal seta placed on border near basal angles,—the puncture from which it rises hardly perceptible, the margin not widened to receive it. Elytra narrow (5·4 × 3·1 mm.), depressed on disc, sharply declivous on sides, these lightly rounded, almost parallel in middle, base much wider than base of prothorax; humeral angles rounded; apical curve feebly sinuate on each side; striæ

cordiformis; all are members of Chaudoir's genus *Opryosternus* which I merge with *Prosopogmus*. *Argutor inedita*, Casteln., which Mr. Blackburn has suggested may be a *Leptopodus*, or a *Simodontus*, does not appear to me, from the description, to belong to either of these genera. The description, if accurate in ascribing to it two impressions at each side of the prothorax and two punctures on the third interstice of the elytra, indicates that it is likely a *Hormochilus;* its cordiform prothorax would exclude it from *Simodontus*, and the two basal impressions of the prothorax from *Leptopodus;* it is fairly well described, and could doubtless be identified if specimens from the original locality were before one.

90. S. AUSTRALIS, Dej. (?)

A species which seems to be the commonest *Simodontus* in South West Australia so closely resembles a specimen in my collection from Melbourne, which I regard as *S. australis*, that I cannot separate it; the only difference I can notice is that the basal border of the elytra is slightly more prominent in the Melbourne specimen; it seems certainly the western representative of *S. australis*, and therefore I have placed it under that name; I do not know if it is the species which Mr. Blackburn has described as *S. australis*, Dej., but most likely it is. The following is a short description :—

Oval, subconvex; head moderate; prothorax lævigate, transverse; elytra with third stria hardly narrower than fourth; prosternum margined on base; mesosternal episterna punctate, metasternal episterna elongate. Black (or piceous-black), shining; under surface piceous; legs and antennæ brownish.

Head smooth, convex, lightly transversely impressed posteriorly; eyes prominent, enclosed at base; prothorax transverse (1·8 × 2·4 mm.), widest about middle, very lightly narrowed to base, strongly narrowed to apex, depressed on disc; sides lightly rounded; apex deeply emarginate; anterior angles prominent, obtuse; base truncate-emarginate; basal angles rounded; border narrow, reaching nearly to middle on anterior margin and to

peduncle on each side of base; a curved linear impression on each side of peduncle (outer basal impression obsolete). Elytra subconvex (4·2 × 2·7 mm.); sides lightly rounded, a little narrowed to shoulders; striæ moderately impressed; interstices not convex, second widest, 3-6 not differing greatly in width at base, lateral interstice becoming convex towards base; basal border arcuate on posterior margin, not dentate at humeral angles; lateral border reflexed.

Length 6·5-7, breadth 2·4-2·7 mm.

Hab.—Swan River, Rottnest Island, Beverley, Bridgetown (Lea).

Note.—The specimens from Bridgetown are even in size (7 mm.), while those from Swan River, Rottnest Island, and Beverley are smaller, and appear narrower (especially the prothorax); they also have the elytra less strongly striate, and with the external angles of the basal border a little more marked, but I cannot regard them as a different species, though West Australian collectors may ultimately prove them to be so, or at least entitled to rank as a variety.

91. S. SEXFOVEATUS, Chaud.; l.c. Sp. 905.

I believe the species described below to be *S. sexfoveatus*, Chaud., and that the original description was founded on an old specimen which had undergone a lengthened immersion in alcohol (such a specimen is in my possession, given to me by Mr. Masters as from King George's Sound). If I am right in my identification of this species, the habitat "Queensland," given by Count de

descent; under surface piceous-brown; tibiæ, tarsi and antennæ ferruginous.

Prothorax transverse (1·5 x 2 mm.), widest about middle, hardly narrowed to base, gently but decidedly narrowed to apex; sides lightly rounded; apex strongly emarginate; anterior angles prominent, obtuse; base truncate-emarginate; basal angles obtuse; base longitudinally impressed on each side of peduncle; external basal impression wide, feebly marked. Elytra oval, hardly wider than prothorax (3·5 x 2·1 mm.), lightly convex; sides very lightly rounded, hardly narrowed to shoulders; striæ well marked; interstices depressed on disc, those on sides convex towards apex, second and fourth wide, third much narrower, hardly wider than first; basal striole of second interstice not long; punctures of third interstice strongly impressed; basal border arcuate on posterior margin, with external angles lightly marked.

Length 5·8-6·5, breadth 2·1-2·5 mm.

Hab.—Bridgetown, Donnybrook (Lea).

In facies almost exactly resembling the small specimens of *S. australis*, Dej., from Swan River, but differing by the narrow third interstice of the elytra with its subfoveiform punctures; the fifth interstice, though wider on the disc than the third, becomes equally narrow at the base; it is a marked character of this species that the third and fifth interstices are much narrower at the base than the fourth and sixth.

92. S. OCCULTUS, n.sp.

Oval, robust; head large, smooth; prothorax subquadrate, wider across base than apex; elytra strongly striate, interstices convex, humeral angles marked; prosternum margined on base; episterna of mesosternum punctate, of metasternum short. Piceous-black; under surface and legs reddish-piceous, antennæ ferruginous.

Head convex, not narrowed or transversely impressed behind eyes, these convex, not prominent, enclosed behind; prothorax convex, anteriorly transverse-quadrate (2·1 x 2·5 mm.), lightly narrowed to base, more strongly and roundly narrowed to apex; sides lightly rounded; apex lightly, widely and evenly emarginate; anterior angles obtuse, not prominent; base truncate-emarginate;

decidedly marked; median line lightly impressed; two short well defined basal impressions placed in a wide depression on each side. Elytra short (3·5 × 3 mm.), lightly convex; basal border meeting lateral border at humeral angle in a short hardly dentiform prominence; striole at base of second interstice punctiform; interstices depressed.

Length 6, breadth 3 mm.

Hab. Geraldton (Lea, "on sea beach").

The other described species with which this species is allied by the short metasternal episterna and lightly striate elytra are *S. consimilis*, Chaud., and *S. fortunati*,* Castelu., neither of which is available to me for comparison with *S. lævi*; it is evidently a proportionately shorter and more compact species than either of these, the prominent humeral angle of the elytra should help to distinguish it from *S. fortunati*.

Genus Pseudomorphus.

P. elongatus, n.sp.

Narrow, elongate, lightly convex; prothorax subcordate, finely punctate near base; elytra parallel, strongly declivous to apex, striate, third interstice impunctate. Piceous black, legs reddish-piceous.

Head convex, smooth; front lightly bimpressed; the impressions short, diverging backwards; eyes convex, not prominent. Prothorax a little broader than long (1 × 1·25 mm.), widest rather before the middle; sides lightly rounded, lightly and roundly narrowed to apex, gently and obliquely narrowed to base; apex lightly emarginate; anterior angles obtuse, not prominent; base sloping gently forward on each side of peduncle; basal angles obtuse, lightly marked; border very narrow; median line lightly impressed; a short lightly marked longitudinal basal impression on each side. Elytra long (2·8 × 1·6 mm.), parallel on sides; humeral angles widely rounded; apical curve obsoletely sinuate

* Mr. Blackburn has considered *S. curtulus*, Chaud., a synonym of *S. (Haeoplus) fortunati* (P.L.S.N.S.W. 1889 (2), iv. p. 735). In this I concur.

on each side; striæ strongly impressed, finely and closely punctate; no striole near base; interstices depressed, ninth punctate; lateral border narrow, meeting basal border in an open curve.

Length 5, breadth 1·6 mm.

Hab.—Beverley (Lea). This species is at once distinguished from *P. planiusculus*, Chaud., by its narrower and more convex form, and by having the posterior third of the prothorax covered with a fine dense puncturation.

Genus DARODILIA.

95. D. EMARGINATUS, n.sp.

Robust, convex; body not pedunculate; head shortly but decidedly biimpressed; prothorax convex, cordate, a little narrower across base than apex; elytra ovate, strongly striate, base emarginate; prosternum with episterna lævigate; labrum emarginate; mandibles prominent, decussating. Black.

Head convex, declivous to labrum; a short deep outwardly curved impression on each side of front; clypeal suture connecting apices of frontal impressions; eyes round, convex. Mentum widely but not deeply emarginate; lobes short, obtuse at apex; sinus lightly oblique on sides, middle shortly and widely advanced. Palpi: maxillary with second joint rather stout, arcuate, third shorter, cylindrical, thickened to apex, terminal longer than penultimate, truncate-oval; labial with two terminal joints about

narrow, reflexed; basal border weak, joining lateral border at humeral angle without any projection. Prosternum bordered on anterior margin. Metasternal episterna narrow, elongate. Ventral segments impunctate, three apical ones transversely sulcate. ♂ with three basal joints of anterior tarsi lightly dilatate and squamulose beneath.

Length 6·5-7·5, breadth 2·4-2·6 mm.

Hab.—Upper Ord River (Helms).

A distinct species, which is differentiated thoroughly from all the previously described species of *Darodilia* by having the head strongly biimpressed; the sides of the prothorax subsinuate before the base; the elytra with six strongly impressed striæ on each, and the base emarginate.

Genus ABACETUS.

96. A. MACLEAYI, Blkb.; l.c. Supp. Sp. 7495. *Hab.*—Upper Ord River (Helms). Seems a slight variety.

Tribe *LICININI*.

Having a new genus to add to the Licinini, it has seemed advisable to offer a tabular list of the Australian genera belonging to the tribe, more especially as some of these are now referred to other tribes.

Lestignathus seems certainly to belong to the Licinini notwithstanding that it has been referred to the Platynini on the high authority of Dr. G. H. Horn (Trans. Am. Ent. Soc. 1881, ix. p. 143); it is nearly allied to *Lacordairia*, the anterior tarsi of the ♂ being as in the Licinini, not as in the Platynini. I would draw attention to Dr. Horn's remark on the mentum of *Lestignathus*—"I observe that the suture between the mentum and its support is as completely obliterated as in *Enceladus*. It is the only instance known to me of this character in the present [Platynini] or the preceding tribe" [Licinini]. This, however, occurs to a more or less degree in the genera *Lacordairia*, *Siagonyx*, *Platylytron*, *Microferonia* and *Hormacrus*.

Lacordairia is a genus of the Licinini; I have identified *L. proxima*, Chaudn., from named specimens in the Howitt Collection, and regard it as typical of the genus.

Platylytron is evidently a member of this tribe; the absence of an internal plica interrupting the margin of the elytra posteriorly would in itself prevent its coming into the Panagæini, to which tribe Sir William Macleay referred it.

Table of Genera.

A. Mentum joining gulæ without support at base.
  B. Antennæ with two basal joints glabrous..... LESTIGNATHUS.
  BB. Antennæ with three basal joints glabrous.
    C. Metasternal episterna quadrate (short).
      D. Labrum deeply excised, prosternum not margined at base..... LACORDAIRIA.
      DD. Labrum short, sinuate-emarginate; prosternum margined at base..... SIAGONYX.
    CC. Metasternal episterna decidedly longer than broad.
      E. Apical curve of elytra sinuate on each side.. HORMACRUS.
      EE. Apical curve of elytra without a sinuosity on each side.
        F. Size large, fourth joint of antennæ shorter than third and fifth..... PLATYLYTRON.
        FF. Size small, fourth joint of antennæ a little longer than third..... MICROFERONIA.
AA. Mentum supported at base by a submentum.

Labrum short, subtruncate (anterior margin lightly bisinuate), quadrisetose (a large setigerous puncture at each lateral angle and a small one on each side of the slightly prominent middle).

Mandibles with apex wide and deeply emarginate.

Antennæ slender, filiform; three basal joints glabrous, basal joint stout, rather long—not as long as two succeeding together, second joint about half the length of third, others equal.

Mentum not divided from gulæ at base, concave, deeply emarginate; sinus edentate.

Palpi: labial with penultimate joint shorter than terminal, cylindrical, bisetose in front, terminal joint swollen, pyriform, truncate at apex, sparsely setose; maxillary with second joint long, stout, subcylindrical, penultimate shorter than terminal, slender, cylindrical, lightly incrassate, terminal rather stout, oblong-oval.

Prothorax subquadrate with sides and angles rounded, widely impressed on each side of base; lateral margins widely explanate posteriorly; posterior marginal puncture on edge a little before basal angle.

Elytra very wide, apical curve short, widely sinuate on each side; a short striole at base of first interstice.

Prosternum with intercoxal part narrow, bordered; basal declivity very narrow in middle.

Mesosternum concave between coxæ.

Metasternum as long between coxæ as length of posterior coxæ, narrow and pointed between intermediate coxæ; episterna much longer than broad.

Legs (♀) long, slender: tarsi setigerous beneath; anterior with joints dilatate, successively shorter, penultimate joint small, cordate.

Allied to *Platylytron* from which it differs by the shape of the palpi and mentum, the marginate prosternum, the elytra sinuate on each side of apex, &c.

97. H. LATUS, n.sp.

♀. Alate, wide, lightly convex; head small; prothorax small, transverse; elytra wide, striate, third interstice bipunctate. Black, shining.

Head lightly biimpressed between antennæ; eyes convex, prominent, enclosed behind. Prothorax transverse (2·6 × 3·2 mm.), much wider across base than apex; sides rounded; apex bordered, emarginate; anterior angles rounded, not marked; basal angles widely rounded; lateral margins explanate, slightly rugose-punctate; median line lightly marked; a wide depression on each side of base. Elytra nearly twice as wide as prothorax (8·2 × 6 mm.), widest rather behind middle; shoulders rounded; apex wide; striæ strongly impressed, seventh not lighter than others; interstices lightly convex, eighth wider than seventh, ninth narrow on sides, wide towards apex, seriate-punctate, the punctures wide apart in middle; border reflexed; marginal channel wide.

Length 13, breadth 6 mm.

Hab.—Mount Barker (Lea, one specimen).

Genus PLATYLYTRON.

98. P. AMPLIPENNE, Macl.; l.c. Sp. 540. *Hab.*—Mount Barker (Lea).

Genus MICROFERONIA.

I would refer to this genus *Lacordairia anchomenoides*, Casteln., *L. argutoroides*, Casteln., *L. marginata*, Casteln., and *Badister anchomenoides*, Macl. The episterna of the metasternum vary slightly in length in different species, but are always longer than

prothorax depressed, transverse, wider at base than apex; elytra finely striate, first stria bifurcating near base. Piceous-black; prothorax on sides and elytra on whole circumference with narrow ferruginous margin; mandibles, labrum, clypeus and base of antennæ ferruginous; under surface piceous; inflexed margins of elytra and femora testaceous; tibiæ, tarsi, antennæ and palpi brownish.

Head short, convex, finely shagreened; mentum not divided from gulæ by a raised submentum; eyes large, convex, a little distant from buccal fissure. Prothorax closely applied at base to base of elytra, lævigate, transverse (1·3 × 1·8 mm.), widest before middle, lightly and roundly narrowed to apex, very little narrowed to base; apex deeply emarginate, finely bordered; anterior angles obtuse; base truncate; posterior angles widely obtuse; border lightly reflexed on sides, wanting on middle of base; median line fine; a very shallow wide basal impression on each side. Elytra oval (3·9 × 2·5 mm.), lightly convex; base hardly wider than base of prothorax; humeral angles obtuse; apical curve even; striæ finely impressed, simple; interstices depressed, third bipunctate on disc, ninth narrow, wider to apex, seriate-punctate; a single puncture on seventh stria near apex; border reflexed.

Length 6, breadth 2·5 mm.

Hab.—Bridgetown (Lea).

Differs from *M. adelaidæ*, Blkb., (the type of the genus), by its much larger size, its upper surface not iridescent, &c. It is like *M. (Lacordairia) marginata*, Casteln., but more depressed, the prothorax a little more transverse and dilatate at widest part, the elytra less nitid, &c. *M. (Badister) anchomenoides*, Macl., is an iridescent species a little larger and proportionately a little narrower than *M. cinctipennis*; it also has the metasternal episterna a little longer, and is without the light-coloured margins (and inflexed margins) of prothorax and elytra. *M. (Lacordairia) anchomenoides*, Casteln., and *M. (Lacordairia) argutoroides*, Casteln., are unknown to me in nature.

Genus DICROCHILE.

101. *D. gokyi*, Boisd.; l.c. Sp. 213. *Hab.*—Swan River, Rottnest Island, Pinjarrah, Mount Barker (Lea).

Tribe *PLATYNINI.*

Genus PLATYNUS.

102. *P. marginicollis*, Macl.; l.c. Sp. 226. *Hab.*—Swan River, Rottnest Island (Lea).

Genus PRISTONYCHUS.

103. *P. australis*, Blkb., P.L.S.N.S.W. 1888, (2) iii. p. 811 *Hab.* Swan River (Lea).

Tribe *ODACANTHINI.*

Genus EUDALIA.

104. *E. waterhousei*, Castelu.; l.c. Sp. 62. *Hab.*—Upper Ord River (Helms).

Tribe *LEBIINI.*

The limits of the tribe Lebiini as used in this paper are very wide, and include forms so diverse that some of them might be

bent upon its author to define it, or at least to indicate some character as diagnostic of it, also, to show its relationship to other named groups of the tribe; these things I am not able to do among the Lebiini. The subject is a most difficult one, as the following quotations from Dr. Horn's work (Trans. Am. Ent. Soc. 1881, ix.) will show:—"After having given the tribe a careful study, having purposely left it for the final work in the present paper, I have found myself with the same result as that arrived at by Lacordaire and LeConte, namely, that it is not possible to divide the tribe in any satisfactory manner (p. 154). . . . . In concluding the Lebiini I regret to believe that the genera have been inordinately multiplied, and the higher divisions whether called groups, tribes, or subfamilies, have become so numerous and are based on such shadowy characters as to envelop the subject in an almost impenetrable cloud" (p. 159).

Table of Genera known to me.

I. Fourth joint of tarsi bilobed.
A. Antennæ inserted considerably in front of eyes.
b. Tarsi setose on upper surface..... XANTHOPHŒA.
bb. Tarsi glabrous on upper surface..... TRIGONOTHOPS.
AA. Antennæ inserted near eyes.
C. Mentum edentate..... PHLŒODROMIUS.
CC. Mentum dentate ..... *Sarothrocrepis.* *Ectroma.*

II. Fourth joint of tarsi entire.
D. Mentum supported at base by a raised submentum.
E. Mandibles with scrobes externally, neck not condyliform.
F. Head not convex between eyes, postocular prominences not large.
G. Mesosternum narrow and abrupt between intermediate coxæ.
H. Head constricted and transversely impressed behind eyes, so as to form a distinct neck, tarsi glabrous on upper surface (interstices of elytra lævigate).
I. Ungues serrate.....

j. Head obliquely narrowed behind eyes..... DIABATICUS.*
jj. Head abruptly constricted behind eyes ... PHLŒOCARABUS.*
ii. Ungues simple..... COPTOGLOSSUS.
HH. Head not transversely impressed across occiput, tarsi sparsely setose on upper surface.
k. Elytra strongly striate; interstices convex, lævigate..... EUCALYPTOCOLA.
kk. Elytra substriate, finely and densely setose-punctate.
l. Penultimate joint of labial palpi shorter than apical (labrum short)..... AGONOCHILA.
ll. Penultimate joint of labial palpi not shorter than apical..... PHILOPHLŒUS.
GG. Mesosternum wide and oblique between intermediate coxæ.
m. Antennæ inserted considerably in front of eyes, ungues simple..... HOMOTHES.
mm. Antennæ inserted near eyes, ungues serrate..... DROMIUS.
FF. Head convex, postocular prominences large, swollen (antennæ inserted considerably before eyes).
n. Metasternum large with elongate episterna; mentum dentate..... ANOMOTARUS.
nn. Metasternum small with short episterna; mentum edentate.
o. Upper surface glabrous, elytral inter-

The following genera belonging to the Australian Lebiini are omitted from the table because they are unknown to me in nature (with the exception of *Eulebia* [two species] they contain but one species each):—*Lachnoderma*, *Eulebia*, *Idius*, *Ectinochila*, *Plagiotelum*, and *Taromorpha*.

Cymindis is a genus which I do not think occurs in Australia; *C. ænea*, Macl., is conspecific with *Anomotarus olivaceus*, Chaud.; *C. illawarræ*, Macl., is a very closely allied species, the distinctness of which appeared to me, when examining the types, doubtful, but which Mr. Masters regards as a good species. I should expect the third species, *C. crassiceps*, Macl., to prove a species of *Taromorpha*.

Demetrius, as exemplified by the Australian species referred to it, I cannot differentiate from *Xanthophæa*.

Perigona is not a Lebiid; it has been referred to the Platynini by Dr. G. H. Horn.

Catascopus is a genus I have not investigated, and on the position of which I have nothing to say.

Plochionus humeralis, Macl., and *P. semivittatus*, Macl., are both dealt with further on.

Genus XANTHOPHŒA.

105. X. VITTATA, Dej.; l.c. Sp. 127. *Hab.*—Bunbury (Lea).

106. X. ELONGATA, n.sp.

Narrow, elongate, depressed; head narrow, elongate; prothorax of equal length and breadth, sides strongly sinuate posteriorly, basal angles reflexed and sharply rectangular; elytra twice as wide as prothorax, a little narrower towards base, squarely truncate at apex, strongly striate, interstices hardly convex, glabrous, minutely punctate, third tripunctate (sometimes bipunctate). Testaceous; prothorax with a piceous longitudinal plaga on each side of disc; elytra with three piceous black vittæ and often infuscate behind peduncle; antennæ ferruginous, basal joint pallid; (sutural vitta occupying first interstice of each elytron on basal third and spreading over second posteriorly; lateral vittæ extending nearer to apex than sutural one, occupying sixth, seventh and

part of eighth interstices on basal half, spreading inwards posteriorly on to fourth interstice; third interstice infuscate and uniting the vittæ near apex of sutural one).

Head lævigate, longer than broad (1·7 × 1·4 mm.), convex, lightly transversely impressed behind eyes, constricted to a neck at base; front shortly biimpressed between antennæ; eyes convex, not very prominent; postocular processes about half length of eyes, projecting strongly and roundly from neck. Prothorax narrow, very little wider than head (1·5 × 1·5 mm.), hardly wider across base than apex; disc convex; margins wide, reflexed; sides lightly rounded on anterior two-thirds, widely sinuate at posterior fourth, a little outturned before base; apex hardly emarginate; anterior angles not advanced, roundly truncate; median line strongly impressed. Elytra nearly twice as wide as prothorax (5 × 3·2 mm.), widest about posterior third; base truncate, humeral angles widely rounded.

Length 7·5-9, breadth 3·2 mm.

Hab.—Rottnest Island (Lea).

In a general way resembling *Trigonothops longiplaga*, Chaud., the elytra having a very similar pattern, but the discoidal pale markings more elongate. The conjunction of the black vittæ of the elytra at the apical fourth seems to differentiate it from all previously described species. The puncturation of the elytral interstices is much finer and less dense than in *K. vittata* Dej.

tate, narrow, sides strongly sinuate posteriorly, basal angles reflexed and sharply rectangular; elytra strongly striate, interstices convex, glabrous, minutely punctate, third tripunctate. Wholly testaceous.

Head rather longer than broad (1·7 × 1·6 mm.), impunctate; front depressed, biimpressed before eyes; space between frontal impressions and sides obsoletely carinate; eyes prominent; sides strongly constricted to neck, swollen and sloping obliquely behind eyes; a wide foveiform impression on each side behind eyes above postocular prominences. Prothorax not perceptibly wider than head with eyes, not broader than long (1·8 × 1·8 mm.), hardly wider across base than apex, lightly declivous to sides on anterior half, longitudinally impressed on each side posteriorly at width of peduncle (the space between these impressions and margin depressed), transversely rugulose near sides, lævigate on disc; sides lightly rounded on anterior two-thirds, widely sinuate at posterior fourth, a little outturned before basal angles; apex strongly emarginate; anterior angles rounded; median line deep, reaching from base to apex; border reflexed (greatly so posteriorly, hardly so near anterior angles). Elytra parallel (6 × 3·5 mm.), nearly twice as wide as prothorax; base sloping roundly to shoulders; striæ crenulate; third interstice tripunctate, fifth with a strongly marked setigerous puncture about posterior third and two much finer near anterior third.

Length 10, breadth 3·5 mm.

Hab.—Bridgetown (Lea).

Allied to *X. infuscata*, Chaud., from which (and from *X. angustula*, Chaud.) it differs by its larger size, paler colour, impunctate head and prothorax, much finer puncturation of elytral interstices, &c.; from *X. satelles*, Blkb., another allied species, it differs by the want of piceous vittæ on the elytra, and the presence of setigerous punctures on the fifth interstice.

Genus Trigonothops.

108. *T. (Plochionus) humeralis*, Macl., (?) P.L.S.N.S.W. (2), iii. 1888, p. 454.

The collection contains eighteen specimens of a species of *Trigonothops* (the largest species of the genus), of a general brownish colour, which, though a little larger than *Plochionus humeralis*, Macl., agrees too closely with the description of that species to be regarded as different, though a comparison with the type might possibly show it to be another species.

Its coloration may be described as follows:—Head reddish, prothorax reddish brown, disc piceous; pattern of elytra similar to that of *T. longipluga*, Chaud., lateral margin testaceous, ninth interstice brownish, first, sixth, seventh, and eighth interstices piceous-black (the black uniting at apical third), second, third and fourth interstices brownish on anterior two-thirds, apex brownish, clouded with piceous. The third interstice of the elytra is bipunctate near second stria (excluding a puncture at apical extremity); the anterior puncture found in *T. pacifica*, Erichs., near the third stria, is wanting. The posterior tarsi have the fourth joint smaller than in *T. pacifica*, and not produced

111. E. BENEFICUM, Newm.; l.c. Sp. 148. *Hab.*—Mount Barker, Bunbury, Rottnest Island (Lea); Albany (Helms).

112. E. PARVICOLLE, Blkb.; l.c. Supp. Sp. 7264. *Hab.*—Rottnest Island (Lea).

Genus PHLŒOCARABUS.

It is not unlikely that *Phlœocarabus*, *Diabaticus* and *Notoxena* represent three allied types that may be worth maintaining as generically distinct from one another, but with the insufficient material at my disposal I unite *Notoxena*, proposed by Chaudoir for *Trigonothops nigricollis*, Macl.,* with *Phlœocarabus*, and only separate *Diabaticus* from *Phlœocarabus* with doubt.

113. P. NIGRICOLLIS, Macl.; l.c. Sp. 107. *Hab.*—Upper Ord River (Helms).

As noted above, Chaudoir has pointed out that *Trigonothops nigricollis*, Macl., cannot remain in the genus *Trigonothops* on account of its tarsi having the fourth joint entire for one thing; however it appears to me that it may with fitness be placed in *Phlœocarabus*.

114. P. (PLOCHIONUS) SEMIVITTATUS, Macl., P.L.S.N.S.W. (2), iii. 1888, p. 455. *Hab.*—Upper Ord River (Helms).

Three specimens that agree with the description of *Plochionus semivittatus*, Macl.; to me it seems congeneric with *Trigonothops nigricollis*, Macl., though differing greatly in the shape of the prothorax; I therefore place it with that species.

Genus AGONOCHILA.

115. A. FROGGATTI, Macl.; l.c. Supp. Sp. 7267. *Hab.*—Upper Ord River (Helms).

I place this species in *Agonochila* because it has the palpi as in that genus and the intermediate tarsi without squamulæ beneath any of the joints.

116. A. CHAUDOIRI, n sp.

Depressed; head very finely shagreened and minutely punctate; prothorax large, deeply emarginate, posterior angles subrectangular;

elytra striate, shagreened, setigero-punctate, base emarginate in middle and roundly advanced at shoulders. Head and disc of prothorax, tibiæ, tarsi and antennæ ferruginous (disc of prothorax and vertex sometimes infuscate); elytra piceous-black, apex, narrow lateral margin and two large oval discoidal maculæ testaceous (discoidal maculæ extending across interstices 2-4, testaceous apical margin wide—much wider on interstices 1-4 of each elytron); femora and inflexed margin of elytra pale testaceous.

Head rather elongate, obliquely narrowed behind eyes; front depressed, widely and lightly biimpressed; eyes prominent, hardly globose. Prothorax much wider than head (1·3 × 1·8 mm.), widest just behind anterior third, depressed; disc shagreened, setigero-punctulate, finely rugulose; margins widely explanate, densely rugose-punctate, lightly upturned towards base; sides roundly subangulate at widest part, strongly roundly-obliquely narrowed anteriorly, lightly narrowed and subsinuate posteriorly; anterior margin deeply emarginate; anterior angles projecting a little, obtuse; base widely and feebly lobate in middle, obliquely truncate on each side; basal angles subrectangular, obtuse at summit; median line strongly impressed. Elytra much wider than prothorax (4 × 3 mm.), widest about posterior third, roundly truncate at apex; sides rounded, strongly and roundly widened behind humeral angles. Length 7·8, breadth 3·3-3 mm.

Hab.—Pinjarrah (♀), Mount Barker (♂). (Lea).

This species has a considerable superficial resemblance to *Trigonothops pacifica*, Erichs. It seems to agree so closely with the description given by Baron Chaudoir of the species he calls *A. (Lebia) mollis*, Newm., that I think it may be the species he had before him, but in that case I cannot agree with him in his identification of it as *A. mollis*, which is, from Newman's description, a species allied to and rather smaller than *A. lutosa*, Newm., and, if so, having no resemblance to the species Chaudoir described as *A. mollis*. The description I have given is founded on specimens (♂) from Mount Barker; the ♀—judging from the specimens before me—has the prothorax infuscate and not so long as the ♂; it is possible the sexes of two slight varieties (but not,

I think, two species) may be represented by the specimens before me from Pinjarrah and Mount Barker respectively.

117. A. RUFICOLLIS, n.sp.

Depressed; head finely shagreened and minutely punctulate; prothorax short, smooth, lightly emarginate, middle of base hardly projecting, posterior angles obtuse; elytra lightly striate, shagreened and minutely punctulate. Head, prothorax, under surface, tibiæ, tarsi and antennæ ferruginous; elytra piceous-black, apex, a narrow lateral margin and two discoidal maculæ testaceous; inflexed margin of elytra and femora pale testaceous (the maculæ of the elytra variable in size, placed before middle, extending across interstices 2 6, suboval in shape with a shorter projecting part on fifth and sixth interstices; testaceous apical margin wide, projecting triangularly forward in middle).

Head not short; front depressed, not rugulose, lightly and widely impressed on each side; occiput convex; eyes globose, prominent. Prothorax transverse (1 × 1·5 mm.), widest at anterior third, a little convex, very finely shagreened and minutely setigero-punctate; explanate margins not wide, hardly rougher than disc; sides roundly narrowed anteriorly, obliquely narrowed posteriorly, not sinuate before basal angles; anterior margin lightly and evenly emarginate; anterior angles widely rounded; base roundly and weakly lobate in middle, sloping roundly obliquely forward to basal angle on each side; basal angles roundly obtuse; median line strongly impressed. Elytra much wider than prothorax (3·4 × 2·5 mm.), widest about posterior third, a little narrowed to base, roundly truncate at apex; base truncate on each side (shoulders hardly advanced); humeral curve of border wide, hardly subangulate.

Length 5-6, breadth 2-2·7 mm.

Hab.—Mount Barker (Lea).

Allied to *A. curtula*, Erichs., from which the following differences readily distinguish it:—The red colour of the prothorax; head less strongly punctate; prothorax much smoother, explanate margins not rugose, sides more evenly rounded, posterior angles

densely and finely punctulate. Piceous-brown, occiput and explanate margins of prothorax more lightly coloured; elytra with reflexed margins, a wavy fascia on discoidal third of each and apex testaceous (the discoidal fasciæ extending from first to seventh interstices, narrow, of an irregular W-shape, sloping lightly obliquely backwards externally; the piceous ground colour of the elytra projecting sharply and triangularly into the apical testaceous margin about middle of each elytron); under surface rather infuscate; coxæ, femora and base of antennæ testaceous; tibiæ, tarsi and antennæ (excepting base) darker.

Prothorax small, transverse (7 × 1·2 mm.), widest about anterior third; disc finely shagreened; lateral margins widely explanate, finely punctate; sides obsoletely angulate and setigero-punctate at widest part, strongly and roundly narrowed anteriorly, lightly narrowed posteriorly, usually subsinuate before basal angles; anterior angles obtuse; base obliquely truncate on each side; basal angles rectangular with summit rounded; median line strongly impressed. Elytra greatly wider than prothorax (2·4 × 2 mm.), lightly convex, finely setose and punctulate (the setæ very fine and short); striæ obsolescent; shoulders rounded; base declivous to peduncle.

Length 3·8-4·3, breadth 1·8-2 mm.

Hab. —Swan River, Rottnest Island, Mount Barker (Lea).

Nearly allied to *A. fenestrata*, Blkb., from which the markings of the elytra readily distinguish it; the elytra are more convex with the puncturation less marked; the prothorax is a little wider. It should be noted that instead of four setigerous punctures on the third interstice of the elytra, as is usual in the genus, only one is perceptible; it is placed a little in front of the apical pale margin (this being about the usual position of the second puncture from the apex); the anterior puncture usually so noticeable about the basal fourth of the third interstice seems quite wanting in this species.

119. A. FENESTRATA, Blkb.; l.c. Supp. Sp. 7275. *Hab.*—Mount Barker, Bridgetown, Bunbury (Lea).

Note.—One specimen from Bunbury has a small testaceous spot on each elytron near the suture, a little before the apex.

Genus PHILOPHLŒUS.

Before describing the two new species of ***Philophœlus*** contained in Mr. Lea's West Australian collection, I offer a table of the species known to me, followed by notes on some previously described species.

Table of Species.

I. Prothorax with more than two setigerous punctures on each lateral margin.
  A. Elytra with testaceous discoidal vittæ.
    B. Posterior margin of apical ventral segment plurisetose.
      c. Intermediate tarsi of ♂ with three basal joints squamulose beneath.
        d. Discoidal vittæ of elytra reaching base and extending nearly to apex ..... ***P. australis***, Dej.
        dd. Discoidal vittæ of elytra not reaching base and not extending backwards beyond posterior fourth..... ..... ***P. distinguendus***, Cl
      cc. Intermediate tarsi of ♂ with two basal joints only squamulose beneath..... ***P. eucalypti***, Germ. / ***P. laticollis***, Blkb.
    BB. Posterior margin of apical ventral segment quadrisetose.
      e. Prothorax with apex lightly emarginate, discoidal vittæ hardly extending behind middle of elytra ..... ***P. quadripennis***, Cl

ff. Prothorax with middle of base truncate — *P. truncatus*, Sl.

AA. Elytra without pale vittæ on disc.

i. Head large; prothorax not greatly wider than head, not deeply emarginate at apex, anterior angles lightly marked ..... — *P. planus*, Newm. / *P. unicolor*, Ch.

ii. Head small, prothorax much wider than head.

j. Prothorax with apex lightly emarginate.

k. Prothorax with anterior angles widely rounded..... — *P. occidentalis*, Blkb.

kk. Prothorax with anterior angles marked..... — *P. opaciceps*, Blkb.

jj. Prothorax with apex deeply emarginate.

l. Prothorax with sides lightly rounded, base lightly lobate in middle..... — *P. discorufus*, Sl.

ll. Prothorax with sides ampliate and strongly rounded, basal lobe strongly developed..... — *P. immaculatus*, Ch.

II. Prothorax with two setigerous punctures on each side.

M. Testaceous discoidal vittæ of elytra continuous, extending behind middle.

n. Prothorax deeply emarginate at apex, testaceous discoidal vittæ of elytra uniting near apex..... — *P. intermedius*, Ch. / *P. sydneyensis*, Blkb.

nn. Prothorax very lightly emarginate at apex, discoidal vittæ of elytra attenuate posteriorly and not inturned near apex... — *P. confertus*, Blkb.

MM. Each elytron with a testaceous mark of varying shape on anterior part of disc and usually with apex or a small apical spot of same colour.

o. Discoidal testaceous plaga elliptical (narrow, elongate)..... — *P. angulatus*, Ch.

oo. Discoidal testaceous markings irregular, extending from first to seventh interstices... — *P. luculentus*, Newm.

Notes on some previously described species of Philophlœus.

P. eucalypti, Germ., = *P. grandiceps*, Chaud.—There seems no room for doubt but that Chaudoir was mistaken in his identification of *P. ecucalypti*, Germ. I concur with the Rev. T. Blackburn in assigning the name *P. eucalypti*, Germ., to the species which he has redescribed under that name (P.L.S.N.S.W. (2), iv. 1889, p. 712); and I believe that the species from Adelaide which Chaudoir described under the name of *P. grandiceps* is the same species.

P. laticollis, Blkb., is so closely allied to *P. eucalypti*, Germ., that the differences do not readily lend themselves to tabulation.

P. ornatus, Blkb., is allied to *P. eucalypti*, Germ.; it is unknown to me in nature.

P. brunnipennis, Macl., is unknown to me in nature; the description is so slight that it could only be identified by comparison with the type, or by the inspection of specimens from Gayndah.

P. fuscipennis, Germ.—There appears to me to be little doubt but that this species is synonymous with either *P. planus*, Newm., or *P. unicolor*, Chaud.; after a careful comparison of the unicolorous species in my possession I arrive at the conclusion that it is more likely to be identical with *P. unicolor* than with *P. planus*, but having only one specimen of *P. unicolor*, and that discoloured by age, and being ignorant of the range of the species, I hesitate to place *P. unicolor* under *P. fuscipennis* as a synonym.

P. opaciceps, Blkb.—In colour and general appearance this species almost exactly resembles the species tabulated above as *P. immaculatus*, Chaud., but it differs by having the prothorax less deeply emarginate at apex and with the middle of the base lightly and widely arcuate—not strongly lobed. The ♂ has two basal joints of the intermediate tarsi squamulose beneath; I have drawn Mr. Blackburn's attention to the fact that a male specimen of *P. opaciceps* which he sent me has two basal joints of the intermediate tarsi squamulose, and he has written in reply that such is the case, but that "in the type the squamæ seem to be wanting . . . . and so I passed them over unnoticed." Further, he adds that the comparison he has made in his description of *P. opaciceps* between that species and *P. immaculatus*, Chaud., was not with the species I consider to be *P. immaculatus*, Chaud., (and which Mr. Blackburn now concurs with me in regarding as *P. immaculatus*, Chaud.), but with an undescribed species found in South Australia which has the prothorax less emarginate at apex than *P. opaciceps*, not more so, as is the case with *P. immaculatus*.

P. immaculatus, Chaud.—What I take to be *P. immaculatus*, Chaud., has in my single male specimen only two basal joints of the intermediate tarsi squamulose beneath, not three as said by Chaudoir. I have taken it at Mulwala and near Junee in N.S.W.

P. obtusus, Chaud., is unknown to me in nature; it is evidently allied to *P. angulatus*, but larger and with the posterior angles of the prothorax obtuse.

P. maculatus, Macl., I have not seen; it must resemble *P. obtusus* very closely, so closely, apparently, as to suggest to my mind its possible identity with that species. The description is useless, unless specimens from Gayndah were available, when, no doubt, it would be readily recognised.

P. vittatus, Macl., is probably near *P. angulatus*, Chaud., but very imperfectly described.

P. luculentus, Newm.—The Rev. T. Blackburn has sent me (as from the Victorian Mountains at source of Owen's River) under this name, a species (♀), which agrees with Chaudoir's description of *P. luculentus*, but is smaller (length 6·5 mm.). Another

example (♂) from Galston near Parramatta, has been given to me by Mr. A. M. Lea which has the intermediate tarsi not dilatate, but with two basal joints lightly squamulose beneath. I have not yet seen a *Philophlœus* with only the basal joint of the intermediate tarsi squamulose (and that densely)—the character on which Chaudoir established a separate group for *P. luculentus*.

P. rectangulus, Chaud., is very closely allied to *P. luculentus*; I have not seen it.

The following species, given in Masters' Catalogue as belonging to *Philophlœus*, do not in my opinion belong to that genus: *Lebia irrita*, Newm., *Lebia mollis*, Newm., *Philophlœus dubius*, Macl. *Philophlœus froggatti*, Macl.; all of them, excepting *P. dubius*, I would refer to *Agonochila*. *P. dubius* I would place in *Eucalyptocara* on account of the elytra being deeply striate with the interstices not punctate or pubescent; I have it from Dunoon on the Richmond River, N.S. Wales, and Mr. French has sent me specimens which he took in the mountainous district east of Melbourne.

120. PHILOPHLŒUS TRUNCATUS, n.sp.

Prothorax with apex deeply emarginate, base not lobed in middle, three setigerous punctures on each side; elytra vittate; apical ventral segment with four setæ at apex; intermediate tarsi of ♂ with two basal joints squamulose beneath. Head and prothorax reddish-testaceous; elytra fuscous, lateral margin and a wide discoidal vitta on each elytron testaceous; undersurface

middle of base; shoulders advanced; rounded; sides lightly rounded.

Length 9-10, breadth 4·5-5 mm.

Hab.—Mount Barker (Lea).

This species may be distinguished from all other described species which have vittate elytra by the following characters in combination:—prothorax deeply emarginate at apex, not lobed at base, three setigerous punctures on each side; apical ventral segment with only four setæ. I believe it is the only species yet described with the base truncate. The discoidal vitta on each elytron does not curve inwards towards the suture at the apex; it resembles that of *P. distinguendus*, Chaud., but is wider, not so narrow at apex, and reaches nearer to the apex of the elytron.

121. P. PLANUS, Newm.; l.c. Sp. 174. *Hab.*—Geraldton and Mullewa, Beverley (Lea), Coolgardie.

122. PHILOPHLŒUS DISCORUFUS, n.sp.

Prothorax deeply emarginate at apex, wider between anterior than between basal angles, five setigerous punctures on each side; elytra subparallel, substriate, densely punctulate; intermediate tarsi of ♂ with two basal joints squamulose beneath. Head and prothorax ferruginous-red; elytra piceous with a wide triangular space extending backwards from base on disc and a narrow lateral margin ferruginous; under surface and femora reddish-testaceous; sides and apex of abdomen infuscate; antennæ, tibiæ and tarsi piceous-red.

Head large, depressed, strongly constricted behind eyes; front lightly punctulate; eyes prominent. Prothorax widely transverse (1·6 × 2·9 mm.), widest before middle; sides subangulate at widest part, lightly and roundly-obliquely narrowed anteriorly, obliquely narrowed posteriorly with a wide faint sinuosity before posterior angles; lateral margins explanate, reflexed posteriorly, hardly rugulose, three or four conspicuous setigerous punctures on anterior half of each; anterior margin deeply emarginate; anterior angles prominent, obtuse, projecting out almost as far as eyes; posterior angles obtuse but marked; base arcuate, projecting a little backwards in middle, lightly sinuate on each side of peduncle. Elytra of ordinary shape (5·5 × 4·3 mm.); shoulders

rounded, not prominent; coarsely punctulate—the pubescence short, sparse, inconspicuous.

Length 9, breadth 4·3 mm.

Hab.—Beverley (Lea).

Differs from *P. planus*, Newm., by colour; the prothorax more deeply emarginate at apex, with more prominent and marked anterior angles, &c. In general appearance it greatly resembles *P. occidentalis*, Blkb., but differs by its larger head, the prothorax more deeply emarginate, less rounded on anterior part of sides, and with anterior angles decidedly advanced—not widely rounded. The ferruginous discoidal space on the elytra extends over the five inner interstices at the base, and becomes narrower backwards reaching nearly to the apex along the suture, its outer edges shading gradually into the surrounding piceous colour of the elytra.

123. P. CONFERTUS, Blkb.; l.c. Supp. Sp. 7265. *Hab.*—Swan River, Bunbury (Lea).

124. P. ANGULATUS, Chaud.; l.c. Sp. 158. *Hab.*—Geraldton and Mullewa (Lea).

Genus HOMOTHES.

I am doubtful of the true position of the genus *Homothes* Chaudoir in treating of it* suggested that its place was near *Stenochila*, a genus which, according to Lacordaire's classification, belongs to the Odacanthides, but which Dr. G. H. Horn has

Prothorax hardly wider than head (1 × 1·35 mm.), widest considerably in front of middle; sides angulate at widest part, lightly obliquely narrowed to apex, obliquely (not roundly) narrowed to base, lightly sinuate before base; apex deeply truncate-emarginate; anterior angles prominent, obtuse; base truncate; basal angles rather obtuse. Elytra ovate (4·7 × 2·6 mm.), lightly rounded on sides, lightly striate; third interstice with five faint punctiform impressions; base lightly and semicircularly emarginate behind peduncle.

Length 7·2, breadth 2·6 mm.

Hab.—Swan River, Donnybrook, Mount Barker (Lea).

This species is very closely allied to *H. parvicollis*, Blkb., of which it seems the western representative; but is a little smaller, with narrower elytra less rounded on the sides. *H. parvicollis* and *H. vicinus* seem to be separated from the other described species of *Homothes* by the shape of the prothorax (but I do not know *H. elegans*, Newm., and *H. sericeus*, Er.). All the other species known to me have the sides of the prothorax rounded behind the marginal seta and with a strong sharp sinuosity near the base which results in the prothorax having a basal lobe; in *H. parvicollis* and *H. vicinus* the sides are obliquely narrowed to the base, and the sinuosity before the base is so wide that the base is in no way lobate in the middle.

Genus Dromius.

127. D. sp.? A small black species represented by a single specimen in too imperfect a state to be dealt with satisfactorily.

Hab.—Bridgetown (Lea).

Genus Nototarus.

128. N. AUSTRALIS, Chaud.; l.c. Sp. 130. *Hab.*—Swan River (Lea).

129. N. CHAUDOIRI, n sp.

Form light, depressed; head large, punctate, narrowed on each side behind eyes; prothorax subcordate, wider across apex than base, rugose-punctate near apex, base and sides, disc transversely striolate and minutely punctate; elytra ovate, emarginate at

near margins; elytra short, truncate, strongly striate, interstices convex, minutely punctate. Opaque, piceous-black; elytra narrowly margined with brown; legs pale brown.

Head and prothorax as in *N. chaudoiri*, Sl., only the basal curve of prothorax shorter, the sinuosities behind the posterior angles more decided, and the base itself more truncate. Elytra short, truncate, widest behind middle (2·8 × 2·3 mm.), a little narrowed to base; sides rounded; humeral angles rounded; striæ deeply impressed, minutely punctate; interstices convex, finely punctate on each side near striæ—elytra in other respects agreeing with those of *N. chaudoiri*.

Length 5-6, breadth 2-2·3 mm.

Hab.—Geraldton and Mullewa (Lea).

Differs from *N. chaudoiri* by its shorter more depressed elytra, with the interstices finely punctate, &c.

Genus PENTAGONICA.

Baron Chaudoir, when treating of this genus, made the following note on its position:—"Je crois que M. Bates a été dans le vrai en les plaçant dans un groupe spécial sous le nom de *Pentagonicinæ* (Trans. Ent. Soc. Lond. 1873, p. 320)."* Commenting on this Dr. G. H. Horn says:—"This is certainly an easy settlement of the difficulty, more particularly as no characters are assigned to the group."†

131. P. VITTIPENNIS, Chaud.; l.c. Sp. 143. *Hab.*—Bridgetown (Lea).

Genus SCOPODES.

The genus *Scopodes* has been considered by the late H. W. Bates to form a distinct subfamily; and Chaudoir has made the following observation on the position of *Scopodes* and *Actenonyx*, a New Zealand genus:—"Ils doivent former un groupe à part voisin des *Lachnophorides*; . . . . . toutefois je n'émets encore cette opinion qu'avec doute."‡

* Bull. Mosc. 1877, lii. p. 213.
† Trans. Am. Ent. Soc. 1881, ix. p. 159.
‡ Bull. Mosc. 1872, xlv. p. 392.

132. S. ATERRIMUS, Chaud., var. (?); l.c. Sp. 204. ***Hab.***—Pinjarrah (Lea).

Two specimens of a species which offers but little difference from *S. aterrimus*, Chaud.; comparing it with specimens that seem typical of *S. aterrimus* the following differences are noted: size a little larger; prothorax wider and more strongly rugose; elytra wider, more widely rounded at shoulders, more opaque, less strongly striate. These differences may be sexual.

Length 5; prothorax 0·8 × 1·2; elytra 2·6 × 2 mm.

Note.—*S. aterrimus* is from S.W. Australia, according to Chaudoir, (my specimens are without locality). The nearly allied species found about Sydney seems a different species.

133. S. BOOPS, Erichs.; l.c. Sp. 206. ***Hab.***—Swan River, Bridgetown (Lea).

134. S. SIGILLATUS, Germ.; l.c. Sp. 210. ***Hab.***—Swan River, Rottnest Island, Beverley, Pinjarrah (Lea).

Tribe *HELLUONINI.*

Genus GIGADEMA.

135. G. BOSTOCKI, Casteln.; l.c. Sp. 78. ***Hab.***—Geraldton and Mullewa (Lea).

Subfamily PSEUDOMORPHINÆ.

Tribe *PSEUDOMORPHINI.*

Note on the Relationship of the Carabidæ of South-west Australia.

The collecting of the Carabidæ of Australia has not been carried out with sufficient care to enable accurate and satisfactory conclusions to be formed as to their distribution; nor are published local lists of general completeness available, except Sir William Macleay's lists for the localities of Gayndah and King's Sound, both of which are deficient in classificatory exactness according to modern ideas. Consequently the data available for the study of the distribution of the Carabidæ in Australia are imperfect and faulty, but some general results may be obtained from an examination of the facts I have been able to bring together.

Insects extend back to such a remote geological period that their present distribution is of little value in establishing zoological regions, though, in some cases, it is useful as throwing additional light on theories in regard to the former dispersion of animals over the globe. Moreover the numbers of species and even of genera are so great that the examination and comparative consideration of them becomes wearisome and tedious to the reader. For the reasons stated my notes on the relationship of the Carabidæ of South-west Australia to those of other parts of the continent will be brief, and will in the main disregard species.

The term South-west Australia, as here intended, refers only to the extreme south-western corner of Australia from a little north of Swan River to King George's Sound; further, I confine my attention almost wholly to the Carabidæ sent by Mr. Lea from that area, because the recorded localities of the species formerly noted as from "West Australia" have in most cases merely a general significance. Also, in contrasting the Carabideous fauna of South-west Australia with that of other parts of Australia, instead of using Professor Spencer's Torresian and Bassian subregions, I shall adopt the term East Australian Slope for the united region, because our knowledge of the distribution of the Carabidæ of these subregions is insufficient to enable me to treat of them separately. The East Australian Slope I limit to the area between the summit of the dividing ranges of Eastern

South-eastern Australia and the sea. I am also compelled by want of further knowledge to restrict the term "Eyrean Subregion" to that part of the continent west of the East Australian Slope and south of a line drawn from Bathurst, in New South Wales, to Alice Springs, and thence to Nickol Bay.

As far as I can judge from the data available, and working within the limitations laid down above, the Carabidæ of Australia in their distribution show a consonance with the rest of the fauna, and support the conclusions arrived at by Professor Spencer in his able summary of the distribution of the fauna of Australia.[6]

Taking South-west Australia as here limited, the Carabidæ sent by Mr. Lea number 98 species, to which 10 previously described species may be added as definitely recorded as having been found within the area under consideration. These 108 species are comprised in 11† tribes and 48 genera; the total recorded numbers for Australia are 21 tribes, 160 genera, and about 1320 species. These figures show that the carabideous fauna of South-west Australia is poor in numbers—though doubtless it will be considerably augmented by future collecting.

I give below four tabulated lists of the number of genera in several divisions of Australia. These lists show their own results and there seems no reason to allude at all fully to them. The endemic Carabidæ of Australia comprise about 118 genera and 735 species. Tables III. and IV. give a comparison of the Carabidæ of South-west Australia with a part of New South Wales which may be looked upon as the extreme south-eastern part of the Eyrean Subregion, viz., an area extending from Mulwala (where the 146th parallel of E. longitude crosses the

TABLE I.—Comparative Table of Genera found in :—

	No. of genera in subregion.	Percentage of Australian Total.	Percentage of Total in subregion.	No. of genera in subregion.	Percentage of Australian Total.	Percentage of Total in subregion.	No. of genera in subregion.	Percentage of Australian Total.	Percentage of Total in subregion.
	121	75	...	92	57	...	48	30	...
Genera common to all subregions	31	...	26	...	...	34	...	...	65
Genera peculiar to each subregion	37	23	30	17	10	18	3	2	6

TABLE II.—Comparative Table of endemic Australian Genera found in :—

	(a) East Australian Slope.			(b) Eyrean Subregion.			(c) South-West Australia.		
	No. of genera in subregion.	Percentage of Aust. Total, endemic gen.	Percentage of Total in subregion.	No. of genera in subregion.	Percentage of Aust. Total, endemic gen.	Percentage of Total in subregion.	No. of genera in subregion.	Percentage of Australian Total.	Percentage of Total in subregion.
	91	77	77	57	49	62	32	27	67
Genera common to all subregions	24	...	endemic 26	...	...	endemic 42	...	...	endemic 75
Genera peculiar to each subregion	37	...	endemic 40	19	...	endemic 33	2	...	endemic 6

TABLE III.

nera and Species in South West Australia and Riverina.

	T Australia.			Riverina.					
	Species.			Genera.			Species.		
	No. in District.	Percentage of Australian Total.	Percentage of District Total.	No. in District.	Percentage of Australian Total.	Percentage of District Total.	No. in District.	Percentage of Australian Total.	Percentage of District Total.
	108	8	...	64	40	...	151	11	...
	82*	6	76	...	...	55	98*	...	65
	26*	2	24	29	...	45	53*	4	35

nber of species in the genera in the same row immediately before them.

TABLE IV.

Comparative Table of endemic Australian Genera (with their Species) in S.W. Australia and Riverina

	South-West Australia.						Riverina.					
	Genera.			Species.			Genera.			Species.		
	No. in District.	Percentage of Australian Total (endemic).	Percentage of District Total.	No. in District.	Percentage of Australian Total (endemic)	Percentage of District Total.	No. in District.	Percentage of Australian Total (endemic)	Percentage of District Total.	No. in District.	Percentage of Australian Total (endemic).	Percentage of District Total.
	32	27	67	73	5·5	67	42	36	66	91	7	60
Genera common to both areas, with their number of species.	20	...	endemic 62	49*	...	endemic 67	...	...	endemic 48	49*	...	endemic 54
Genera found in one area, but not in the other, with number of species.	12	...	endemic 38	24*	...	endemic 33	22	...	endemic 52	42*	...	endemic 46

* These figures show merely the number of species in the genera in the same row immediately before them.

The figures in the tables are approximate only, but as nearly accurate as the nature of the subject allows, and may, I believe, be accepted as substantially correct. It may be as well to note that nineteen species, belonging to eighteen genera, are found in both these areas, nine of which belong to nine endemic genera.

The conclusions deducible from the facts here presented are of a negative rather than a positive character, but the following seem worthy of being noted :—(1) The noticeable absence from South-west Australia of most of the Oriental types which are found in Eastern Australia ; (2) the great development of the Licinini (4 genera, 2 of which are peculiar); (3) the abundance of the Promecoderides, an Australian group characteristic of the Eyrean subregion (3 genera and 16 species in S.W. Australia against 1 genus [Promecoderus] with two widely distributed species in Riverina.)

DESCRIPTIONS OF NEW SPECIES OF AUSTRALIAN COLEOPTERA.

By Arthur M. Lea.

Part V.

DYTISCIDÆ.

Haliplus testudo, Clark. *Hab.* — Forest Reefs, Sydney, N.S.W.

H. gibbus, Clark. *Hab.*—Forest Reefs, Whitton, N.S.W.

H. fuscatus, Clark. *Hab.*—Clarence River, N.S.W.

Pelobius niger, Clark. *Hab.*—Benalla, Vic.

Notomicrus lævigatus, Sharp.—A specimen from the Behn River (E. Kimberley) agrees with the figure and the very brief description of this species.

Hydrocanthus australasiæ, Wehn. *Hab.*—Brisbane, Q.; Clarence River, N.S.W.

Hydrovatus ovalis, Sharp. *Hab.*—Clarence River, Windsor, Tamworth, N.S.W.

H. nigrita, Sharp. *Hab.*—Brisbane, Q.; Clarence River, Sydney, N.S.W.

Bidessus.

A. *Each wing-case provided with a distinct sutural stria.*

Bidessus fuscolineatus, n.sp.

Shining, depressed; very finely pubescent. Testaceous; the elytra paler than prothorax and head, but each with three or four longitudinal stripes of dusky brown, base and suture near base infuscate; sterna ferruginous, abdomen blackish.

Lateral striæ straight, much shorter on prothorax than on elytra; sutural striæ distinct on basal half only. Length 1¼ (vix) mm.

Hab.—Behn River, E. Kimberley, W.A. (Mr. R. Helms).

The smallest Australian species as yet known. The elytral stripes are not continued to the base or apex, but usually coalesce towards the apex. Dr. Sharp's description of *basalis* would almost fit this species; that species, however, is larger, with a more oval outline, darker head, and with the prothoracic striæ curved.

BIDESSUS PUSILLUS, n.sp.

Feebly shining; with very fine pubescence. Pale testaceous; the elytra rusty-brown but with three transverse testaceous fasciæ—the 1st near base and not quite extending to suture, the 2nd beyond the middle and consisting of a few elongate spots, the 3rd close to apex.

Lateral striæ of prothorax curved and shorter than on elytra; on the elytra rather short and indistinct, sutural striæ moderately distinct throughout. Length 1¾ mm.

Hab.—Upper Ord River, E. Kimberley, W.A. (Mr. R. Helms).

A very distinct species. The abdomen, sterna and legs are concolorous with the head and prothorax; the transverse fasciæ of the elytra, especially the 2nd, appear to be composed of

At first sight apparently belonging to *luridus*, but on examination seen to be very distinct. Of the species described by Dr. Sharp it appears to most nearly approach *signatus*, except in size.

B. *Wing-cases destitute of a distinct sutural stria.*

BIDESSUS PICTIPES, n.sp.

Rather widely ovate; shining; with very fine pubescence. Piceous; head, antennæ and prothorax testaceous-red; sterna and abdomen reddish-piceous; legs testaceous, apex of tibiæ and parts of tarsi piceous.

Lateral striæ of prothorax slightly curved, almost as long as on elytra; elytra rather densely and strongly punctate. Length 1½ (vix) mm.

Hab.—Pinjarrah, W.A.

The smallest species of group B. It is scarcely as long as *fusculineatus* but is wider.

BIDESSUS ELEGANS, n.sp.

Subopaque, depressed; with very fine pubescence. Reddish-testaceous, elytra infuscate. In certain lights with a pretty bluish iridescence.

Lateral striæ of prothorax curved, more than half the length of prothorax itself and fully as long as on elytra. Elytra densely and finely punctate. Length 2¼ mm.

Hab.—Beverley, W.A.

On several specimens there is a slight duskiness about the base of head and middle of prothorax. The species superficially strongly resembles *mundus*, but the pallid under surface and curved prothoracic striæ should prevent the two from being confused.

BIDESSUS PRÆLARGUS, n.sp.

♂. Shining, glabrous. Piceous-brown; prothorax reddish testaceous, the base infuscate; under surface and legs reddish testaceous.

Prothoracic striæ deep and straight, shorter than on elytra but more than half the length of prothorax itself. Elytra rather strongly and densely punctate except at side. Length 2½ mm.

♀. Differs in being slightly larger and paler, head testaceous with the base infuscate.

Hab.—Forest Reefs, N.S.W.

The stronger punctures of the elytra do not appear to extend outside of an imaginary line continued from the basal striæ. I have seen many thousands of specimens, but only at Forest Reefs.

BIDESSUS LURIDUS, Macl.—In the index to Dr. Sharp's Monograph and in Mr. Masters' Catalogue this species is placed as a synonym of *bistrigatus*. Dr. Sharp places *bistrigatus* (of which he evidently knew the types) in the section in which the species are without subsutural striæ. Sir Wm. Macleay's description of *luridus* is very brief and rather misleading, as he states that "these (the elytra) are entirely without the subsutural stria." I have four co-types of *luridus*, and in them the sutural striæ, though apparently absent when the elytra are viewed from above, are distinct when viewed from behind, and if they are brushed with water the striæ can be seen from any direction. The species is widely distributed, as besides the specimens from Gayndah I have others from New South Wales and Western Australia. I am not, however, prepared to say that *luridus* is not a synonym

B. ORTHOGRAMMUS, Sharp. *Hab.*—Behn and Upper Ord Rivers, W.A.

B. GODEFFROYI, Sharp. *Hab.*—Behn and Upper Ord Rivers.

B. BASALIS, Macl. *Hab.*—Tamworth, N.S.W.

HYPHYDRUS BLANCHARDI, Clark. *Hab.*—Sydney, Forest Reefs, N.S.W.; Swan River, W.A.

H. AUSTRALIS, Clark. *Hab.*—Gayndah, Q.; Sydney, N.S.W.

H. BIFASCIATUS, Macl. *Hab.*—Tamworth, N.S.W.

STERNOPRISCUS MINIMUS, n.sp.

♀. Subopaque; with very fine pubescence. Black, abdomen piceous-black; prothorax testaceous, the middle black; elytra margined with indistinct testaceous spots, head very indistinctly bimaculate in front; legs testaceous. in places infuscate; antennæ testaceous, the apical and median joints blackish.

Densely and minutely punctate all over. Prothorax depressed on each side of base, the depressions connected together, each bounded outwardly by a straight, slightly oblique ridge. All the tibiæ curved. Length 1¾ mm.

Hab.—Swan River, Donnybrook, W.A.

In certain lights a bluish iridescence may be seen on the elytra and to a less extent on the prothorax. The species strongly resembles *Antiporus femoralis* in miniature.

STERNOPRISCUS MULTIMACULATUS, Clark.—I have a specimen from Whitton which I believe to belong to this species; it has the terminal joint of the antennæ almost as long as the three preceding combined, and these are slightly thickened.

STERNOPRISCUS TARSALIS, Sharp.—The female differs in having the intermediate tarsi much shorter than in the male. The transverse depression of the prothorax is usually absent, but it is sometimes traceable. I have specimens from Sydney, Forest Reefs and the Clarence River.

S. BROWNI, Sharp. *Hab.*—Beverley, Pinjarrah, Donnybr W.A.

S. CLAVATUS, Sharp. *Hab.*—Sydney, N.S.W.

S. MEADFOOTI, Clark. *Hab.*—Forest Reefs, N.S.W.

CHOSTONECTES GIGAS, Bohem. *Hab.*—Sydney, Forest Reefs, N.S.W.

C. NEBULOSUS, Macl. *Hab.*—Sydney, N.S.W.

ANTIPORUS FEMORALIS, Bohem. *Hab.*—N.S.W.; W.A.

A. GILBERTI, Clark. *Hab.*—Forest Reefs, Bathurst, N.S.W.

NECTEROSOMA COSTIPENNE, n.sp.

♂. Opaque, depressed, with very fine pubescence. Piceous: head, antennæ and legs obscure testaceous-red.

Upper surface (except of head, which is finely) rather densely and strongly punctate. Prothorax with a strong curved basal impression bounded at the sides behind by a number of rather strong rugæ. Elytra almost concave along the middle, each about its middle acutely ridged, the ridges continued towards but almost obsolete at base, and entirely disappearing before apex. Tibiæ stout, the anterior moderately strongly notched in the middle. Length 4½ mm.

♀. Differs in being slightly narrower, the prothorax diluted with red, simple tibiæ, thinner tarsi, &c.

Hab.—Tasmania (Mr. A. Simson, No. 2921; Mr. J. J. Towers.

N. DISPAR, Germ. *Hab.*—Mount Lofty, S.A.

N. REGULARE, Sharp. *Hab.*—Beverley, W.A.

MACROPORUS RUFICEPS, Sharp.—I have a specimen from Wyndham which agrees with the description (including the dimensions given) of this species. Numerous specimens from Forest Reefs also agree except that they are larger (the smallest specimen measuring 6 mm.) and that the elytra are occasionally spotted with dull red towards the base.

M. HOWITTI, Clark. *Hab.*—N.S.W.; V.; W.A.; Q.

M. LATERALIS, Sharp. *Hab.*—Pinjarrah, Donnybrook, W.A.

PLATYNECTES GAGATINUS, n.sp.

Highly polished, glabrous. Black; front of head, sides of prothorax, antennæ and legs reddish; abdomen with obscure reddish blotches at the sides; each elytron beyond the middle with a small elliptic testaceous spot.

Rather widely elliptic; densely and finely punctate. Prothorax with subobsolete larger punctures near apex and base, the basal angles moderately acute. Each elytron with two indistinct striæ. Apical segment of abdomen strongly and obliquely strigose. Length 6½ mm.

Hab.—Galston (Dumbrell and Lea), Sydney, N.S.W. (Lea).

In appearance somewhat resembles *spilopterus*, but is flatter, less oblong, and more highly polished; *Bakewelli* is described as having the head impunctate. The elytral spots are too small to be seen without a glass. In one specimen the legs are entirely black.

PLATYNECTES SUBÆNESCENS, n.sp.

Rather highly polished except at the sides; glabrous. Black with a slight bronzy gloss, antennæ and legs dark red.

Rather widely elliptic, densely and finely punctate, the punctures on disc of prothorax and elytra finer than at the sides where the surface in consequence appears to be more opaque

Prothorax with almost obsolete larger punctures near base and apex, posterior angles almost square. Elytra indistinctly striate, towards apex and sides feebly waved. Basal segments of abdomen feebly longitudinally strigose, the others (including the apical) feebly transversely wrinkled or corrugated. Length 7 mm.

Hab.—Swan River, Bridgetown, Beverley, W.A.

In five specimens under examination I am unable to detect any small yellow elytral spots. The bronzy tinge is much less pronounced than in *ænescens*. In *P. Damelii* the basal angles of the prothorax are said to be "*peracutis*."

PLATYNECTES 10-PUNCTATUS, Fabr.—I have specimens of this species from Melbourne to Wyndham and from Cairns to King George's Sound. Dr. Sharp regards the species as containing four distinct varieties :—

1. *spilopterus* of Germar.
2.
3. *Mastersi* of Macleay.
4.

The 2nd variety I have myself named *ocularis*, but erroneously placed it in *Lancetes*. A specimen from Bungendore evidently belongs to the 4th variety.

P. ÆNESCENS, Sharp. *Hab.*—Sydney, Galston, N.S.W.

P. LIMBATUS, Sharp. *Hab.*—Forest Reefs, N.S.W.

Hab.—Galston, N.S.W. (Dumbrell and Lea).

An abundant species. The elytra appear to be iridescent from some directions. This and the following species belong to Dr. Sharp's 1st group; both somewhat resemble *labratus*, but may be at once distinguished by the complete absence of elytral scratches.

COPELATUS PUNCTIPENNIS, n sp.

Shape and colour as in the preceding species.

Head almost impunctate. Prothorax with small punctures on disc and with rather strong submarginal punctures; strigose-punctate elsewhere. Elytra densely and (for the genus) moderately strongly punctate and with two moderately distinct rows of small punctures. Coxæ at sides with a few deep scratches, towards the base feebly longitudinally strigose; basal segments of abdomen finely strigose. Length 5 mm.

Hab.—Tarago, N.S.W.

Strongly resembles the preceding, but may be at once distinguished by the coarser puncturation. Another specimen differs in having the coxæ rather strongly strigose.

C. NIGROLINEATUS, Sharp. *Hab.*—Upper Ord and Behn Rivers, W.A.

C. LABRATUS, Sharp. *Hab.*—Sydney, Galston, Clarence River, N.S.W.

C. ATER, Sharp. *Hab.*—W.A. (widely distributed).

C. ACUDUCTUS, Clark. *Hab.*—Forest Reefs, Tarago, N.S.W.

C. IRREGULARIS, Macl. *Hab.*—Queensland.

LANCETES LANCEOLATUS, Clark. *Hab.*—N.S.W.; W.A.

RHANTUS PULVERosus, Steph. *Hab.*—Australia (widely distributed and abundant).

HYDATICUS BIHAMATUS, Aubé. *Hab.*—Q.; N.S.W.

H. DAMELII, Sharp. *Hab.*—Sydney.

H. PULCHER, Clark. *Hab.*—Sydney.

RHANTATICUS SIGNATIPENNIS, Lap. *Hab.*—Sydney.

ERETES AUSTRALIS, Erichs. *Hab.*—Whitton, N.S.W.; Coolgardie, Derby, W.A.

CYBISTER TRIPUNCTATUS, Oliv. *Hab.*—Q.; N.S.W.; W.A.

STAPHYLINIDÆ.

TACHYPORUS MINUTUS, n.sp.

Feebly shining; head, basal half of antennæ, prothorax and legs yellow, elytra slightly darker than prothorax; apical half of antennæ and abdomen piceous-black. Prothorax and elytra feebly, the abdomen more densely, clothed with ashen pubescence.

Antennæ moderate, joints 4th-7th moderately, 8th-10th widely transverse, 11th slightly wider than and almost the length of two preceding combined. Finely punctate. Prothorax transverse, apex truncate, base rounded. Elytra longer and wider than prothorax, sides of apex emarginate. Abdomen with five basal segments strongly margined. Length to apex of elytra $\frac{3}{4}$, of abdomen $1\frac{1}{2}$ mm.

Hab.—Galston, N.S.W.

Differs from *rubricollis*, Macleay, by being much smaller and paler, with narrower abdomen and prothorax, and wider elytra.

TACHYPORUS RARUS, n.sp.

Five basal segments of abdomen rather strongly margined. Length to apex of elytra 1⅛, of abdomen 2 (vix) mm.

Hab.—Beverley, Darling Ranges, W.A.; Forest Reefs, N.S.W.

A small dingy species, of which I have seen but a single example from each locality mentioned. The sculpture of the abdomen is invisible under a Coddington lens. The specimen from New South Wales is a little paler and larger than the others.

TACHYPORUS VIGILANS, Oll.—I have numerous specimens from Sydney and Galston agreeing with the description of this species; in the majority of them the antennæ (except the three basal joints) are very dark; in a number, however, they are only slightly infuscate.

CILEA RIVULARIS, n.sp.

Shining; brownish-testaceous, basal three joints of antennæ and apex of 11th paler, rest of antennæ piceous-brown; prothorax sometimes with base and apex paler than rest of surface, sometimes this is the case with apex and suture of elytra and apices of abdominal segments; legs pale testaceous. Glabrous.

Antennæ elongate, 10th joint scarcely transverse, 11th the length of two preceding combined, acuminate at apex. Finely punctate, prothorax more sparsely than head; scutellum and base of elytra feebly transversely corrugate or aciculate; abdomen with six projections below and four above on the 6th segment, 5th with six long black hairs at apex beneath. Prothorax strongly transverse, apex feebly emarginate, base almost truncate. Elytra scarcely transverse, much longer but scarcely wider than prothorax. Basal segments of abdomen finely margined. Length to apex of elytra 1¼, of abdomen 2¼ mm.

Hab.—Tweed River, N.S.W.

A small depressed species, numerous specimens of which were obtained at Tumbulgum during a flood in the Tweed River.

CILEA AMABILIS, n.sp.

Highly polished; head black, prothorax varying from a clear brown to an almost jet black, all its margins paler, scutellum

slightly darker or concolorous with elytra, these testaceous-red and each with a distinct transverse macula (varying from brown to almost black) on each side and terminating considerably before suture; abdomen piceous, three apical segments and apices of the others reddish; legs reddish-testaceous, tarsi much paler; antennæ black or brown, three basal joints and palpi testaceous. Elytra and abdomen with a few feeble yellowish scarcely distinguishable hairs, the former with about five longish black hairs at the side, the latter with more numerous hairs, a hair on each side of base of prothorax.

Antennæ elongate, 10th joint feebly transverse, 11th about once and one-half the length of 10th. Not visibly punctate under a half inch power. Prothorax fully twice as wide as long, apex widely and feebly emarginate, base truncate. Elytra longer than wide, fully twice the length of prothorax, sides almost straight; each elytron feebly separately rounded at apex. Four basal segments of abdomen rather feebly margined. Length to apex of elytra $1\frac{1}{2}$, of abdomen $2\frac{1}{2}$ mm.

Hab.—Forest Reefs, N.S.W.

I refer this species with doubt to *Cilea* on account of its scarcely glabrous elytra and convex form. The species, however, despite its variable colour, is one of the most distinct in the sub-family.

upper, legs paler; antennæ with 4th-10th joints infuscate. Clothed with moderately short golden pubescence, sparser on head and disc of prothorax than elsewhere.

Antennæ with 6th-10th joints slightly transverse but increasing to 10th, 11th not as long as two preceding combined. Prothorax sparsely and minutely, elytra rather more densely punctate. Prothorax large, transverse, posterior angles slightly produced. Elytra narrower and slightly longer than prothorax, sides decreasing to apex, suture feebly raised. Length to apex of elytra 1, of abdomen 2¼ mm.

Hab.—Clarence River, N.S.W.

Resembling some species of *Tachyporus*, but with the abdomen unmargined.

CONOSOMA SECUNDUM, n.sp.

Feebly shining; pale testaceous; intermediate antennal joints very slightly infuscate. Clothing as in *lanceolatum*.

Antennæ with 9th-10th joints slightly transverse and feebly transversely impressed, 11th not much longer than 10th. Prothorax finely, elytra densely and minutely punctate. Prothorax large, slightly transverse, posterior angles rather strongly produced. Elytra about once and one-fourth longer and slightly narrower than prothorax, apex rather strongly emarginate. Length to apex of elytra 1½ (vix), of abdomen 2½ mm.

Hab. Sydney, Galston, N.S.W.

My specimens on a first glance would appear to be immature but this I am convinced is not the case.

CONOSOMA TERTIUM, n sp.

Shining; black; elytra with a large suboblique dark red patch, not quite touching suture, terminating before apex and somewhat variable in extent; abdomen scarcely as dark as prothorax and each of the segments tinged with red at apex; palpi and two basal joints of antennæ yellow, apical joints diluted with testaceous, legs reddish, posterior darker than the others. Rather sparsely (except on abdomen) clothed with short ashen pubescence, abdomen with long black hairs at the sides towards apex.

Antennæ elongate, 10th joint scarcely transverse, 11th about once and one-half longer than 10th, apex transversely acuminate. Head very finely longitudinally and transversely strigose; prothorax finely punctate and microscopically transversely strigose, elytra and abdomen densely and finely punctate and transversely strigose. Prothorax feebly transverse, apex truncate, posterior angles rounded. Elytra not once and one-fourth longer than prothorax, sides almost parallel. Length to apex of elytra 2½, of abdomen 4 mm.

Hab.—Forest Reefs, N.S.W.

Allied to *C. activum*, but larger. Mr. Olliff says that this species is narrower than *rufipalpe;* the present one is wider.

CONOSOMA QUARTUM, n sp.

Shining; piceous-brown; elytra with a rather large dark red macula on each side of base, varying in extent and depth of colour; extreme base of prothorax, apical segments of abdomen, half of 5th and apices of all the others tinged with red; three basal and three apical joints of antennæ and the legs testaceous. Almost uniformly and rather sparsely clothed with very short ashen pubescence; abdominal segments with a few blackish hairs at sides.

Antennæ elongate, 10th joint transverse, 11th wide and

CONOSOMA QUINTUM, n.sp.

Moderately shining; brownish-testaceous, head darker; five basal segments of abdomen slightly darker than elytra, their apices paler; antennæ and legs testaceous, intermediate joints of the former slightly infuscate. Almost uniformly and moderately clothed with short ashen pubescence; four apical segments of abdomen with a few long black hairs at their sides.

Antennæ elongate, 9th-11th joints flattened, 10th feebly transverse, 11th about once and one-fourth longer than 10th. Punctures much as in preceding. Prothorax large, feebly transverse, posterior angles feebly produced. Scutellum moderately distinct, strongly transverse. Elytra about once and one-half the length of prothorax and scarcely narrower, apex feebly emarginate. Length to apex of elytra 2¼, of abdomen 4 mm.

Hab.—Clarence River, N.S.W.

Allied to *rufipalpe*, but broader and less convex than that species.

CONOSOMA SEXTUM, n.sp.

Shining; brownish-testaceous, head concolorous with prothorax and elytra, the latter paler than five basal segments of abdomen except at their apices; antennæ brown, the three basal joints and legs paler. Rather densely and uniformly clothed with short yellowish pubescence, abdomen with a few straggling brown hairs towards apex.

Antennæ rather short, joints subequal, 10th not transverse, 11th about once and one-half longer than 10th. Head almost impunctate, prothorax finely punctate, elytra densely and rather strongly, the abdomen more sparsely punctate. Prothorax widely transverse, base almost truncate. Elytra about once and one-fourth longer and scarcely narrower than prothorax, each elytron subquadrate. Length to apex of elytra 2, of abdomen 3¼ mm.

Hab.—Benalla, Vic. (Mr. R. Helms); Swan River, W.A. (Lea).

A broad depressed species, with rather longer pubescence and thicker hairs than is usual.

CONOSOMA SEPTIMUM, n.sp.

Moderately shining; brownish-testaceous, prothorax slightly paler than elytra; extreme base of prothorax, extreme apex of elytra, apices of basal segments of abdomen and the apical segments tinged with red; antennæ brown, basal half, the palpi and legs testaceous. Uniformly clothed with short ashen pubescence becoming golden on abdomen, sides with a few straggling hairs.

Antennæ moderately long, 9th-10th joints transverse, 11th slightly shorter than two preceding combined. Rather finely and subequally punctate. Prothorax large, moderately transverse, posterior angles feebly produced. Elytra transversely oblong, about once and one-half the length of prothorax, apex feebly emarginate. Length to apex of elytra 2, of abdomen $2\frac{3}{4}$ mm.

Hab.—Tamworth, Forest Reefs, N.S.W.

Allied to the preceding.

CONOSOMA OCTAVUM, n.sp.

Coloured as the preceding, except that the antennæ are much paler, with the 4th-10th joints infuscate. Rather densely and uniformly clothed with short ashen pubescence; abdominal segments with long blackish hairs (rather more numerous than is usual) on their sides

Antennæ elongate, 10th joint not transverse, 11th fully twice

CONOSOMA NONUM, n.sp.

Slightly shining; piceous, apices of abdominal segments tinged with red; antennæ brown, three basal joints and apex of 11th, the palpi and legs testaceous. Rather densely clothed with short yellowish pubescence, very much shorter (the individual hairs scarcely distinguishable) on elytra than elsewhere; apical segments of abdomen with a few long brownish hairs on their sides.

Antennæ elongate, 9th joint scarcely, 10th rather strongly transverse, 11th about once and one-half the length of 10th, its sides excavated towards apex. Prothorax, elytra and abdomen subequally, densely and minutely punctate and transversely strigose. Prothorax large, moderately transverse, base truncate. Elytra fully once and one-half the length of prothorax, sides decreasing to apex, apex feebly emarginate. Length to apex of elytra $2\frac{1}{2}$, of abdomen $3\frac{1}{2}$ mm.

Hab.—Mt. Barker, W.A.

CONOSOMA DECIMUM, n.sp.

Colour as in the preceding except that the antennæ are somewhat paler. Rather sparsely clothed with short ashen pubescence, denser on abdomen than elsewhere, a few straggling hairs towards apex.

Antennæ elongate, 10th joint not transverse, 11th almost twice the length of 10th. Prothorax almost impunctate; elytra very feebly punctate. Prothorax moderately transverse, base feebly incurved, posterior angles feebly produced. Scutellum distinct, transverse. Elytra once and one-half the length of prothorax, sides subparallel, apex almost truncate. Length to apex of elytra $1\frac{3}{4}$, of abdomen $2\frac{3}{4}$ mm.

Hab.—Swan River, W.A.

A moderately distinct species, allied in some respects to *triangulum*, Fauvel.

about once and one-half longer than prothorax, sides straight, apex almost truncate. Length to apex of elytra 2, of abdomen 3¼ mm.

Hab.—Sydney, N.S.W.

Differs from *C. rufipalpe*, Macleay, in being more convex, elytra and antennæ differently coloured, longer antennæ and conspicuous scutellum.

CONOSOMA LANCEOLATUM, n.sp.

Shining; testaceous. Uniformly clothed with short golden pubescence; abdomen with long black hairs at the sides, which on the penultimate segment are rather more dense and extend backwards on each side.

Feebly punctate. Prothorax moderately transverse, posterior angles very feebly produced. Elytra at base the width of prothorax and along suture noticeably longer, apex very feebly emarginate. Length to apex of elytra 1⅓, of abdomen 2½ mm.

Hab.—Clarence River, N.S.W.

A very distinct species, of which I have but two specimens; there are others in the collection of the New South Wales Department of Agriculture.

C. PERSONATUM, Fvl. *Hab.*—Dalmorton, N.S.W.

C. IMPENNE, Fvl. *Hab.*—Beverley, W.A.

C. TRIANGULUM, Fvl. *Hab.*—Pinjarrah, Swan River, Mt. Barker, W.A.; Forest Reefs, N.S.W.

C. RUFIPALPE, Macl. *Hab.*—Tweed, Richmond and Clarence Rivers, Forest Reefs, Sydney, N.S.W.

C. ELONGATULUM, Macl. *Hab.*—Windsor, Sydney, Tweed River, N.S.W.

LEUCOCRASPEDUM SIDNEIENSE, Fvl. *Hab.*—Galston, Sydney, N.S.W.

TACHYNODERUS AUSTRALIS, Fvl. *Hab.*—Wide Bay, Q.

T. HÆMORRHOUS, Fvl. *Hab.*—Sydney.

APPHIANA VERIS, Oll.—The ♀ of this species was unknown to Mr. Olliff. Of it I have taken several pairs *in copula* at Tamworth. The ♀ has antennæ as in *Calodera* and strongly resembles *C. inæqualis*, Fvl.

CAFIUS LAETABILIS, Oll.—Two of my specimens which were compared with the types of this species and also with the description agree in every particular. The specimens were lent to Mr. Blackburn who said he could not distinguish them from *Philonthus longicornis*, Stephens, and that possibly I had made a mistake; however, I am convinced that my identification is correct. With the description of *P. longicornis* (as given by Fauvel) and also with specimens sent me under that name by Mr. Blackburn my specimens agree. Mr. Olliff unfortunately did not come to *Philonthus* in his revision of the family, or doubtless this error would have been rectified.

CAFIUS SERIATUS, Fvl.—I have several specimens from Pelsart Island which agree too closely with the description of this species to warrant my describing them as new, although they are probably distinct. The number of punctures in the dorsal series of the prothorax is liable to variations in several species; of the specimens I doubtfully refer to *seriatus* one has 14 punctures on one side and 15 on the other; another has 12 and 11. Of *C. littoralis*, Fauvel, I have specimens with punctures varying in number from 8 to 13 and frequently different on each side

black; elytra feebly tinged with brown; two apical segments of abdomen, extreme apex of 5th, antennæ, palpi, mandibles and legs red; apices of antennal joints infuscate.

Head densely and minutely punctate, and with moderately dense larger and shallow punctures. Antennæ moderately long, 1st joint as long as 2nd-3rd combined, 2nd-6th subequal, the others gradually decreasing in length, 11th pyriform. *Prothorax* almost quadrate, slightly wider than head and slightly narrower than elytra, posterior angles slightly rounded; densely and shallowly punctate and with almost microscopic punctures; base with a very feeble slightly shining median ridge. *Elytra* slightly longer than wide, and one-third longer than prothorax, widest about the middle, sides somewhat rounded; densely and rather strongly punctate, punctures occasionally transversely confluent. *Abdomen* densely and finely punctate, apical segments feebly punctate. Length to apex of elytra 5, of abdomen 11 mm.

Hab. Tweed River, N.S.W.

The description of *P. Mastersi*, Macleay, would almost exactly fit this species; but on comparing them together some years ago they were seen to be distinct; *P. Mastersi* is a larger insect and, if I recollect aright, stouter and more densely clothed and closer to *australis*, Harold; *æneiventris*, Fauvel, appears to be allied, but the description of the head of that species will certainly not fit *quadraticollis*.

PINOPHILUS JEJUNUS, n.sp.

Narrow, shining. Abdomen, head, middle and sides of prothorax and elytra with very fine ashen pubescence. Black; elytra, apex and margins of four basal segments of abdomen, apical third of 5th and the entire 6th and 7th segments dull red; legs, antennæ and palpi red.

Head with rather strong irregular punctures. Antennæ short, 1st joint as long as 2nd-3rd combined, 2nd slightly longer and noticeably thicker than 3rd, 3rd-10th subequal, 11th briefly pyriform, slightly longer than 10th. *Prothorax* slightly wider than head and almost the width of elytra; subquadrate, very feebly

Hab.—Behn River, E. Kimberley, W.A. (Mr. R. Helms).

Somewhat resembles *olivaceus*, Macleay, in general appearance, but differs in being larger, more coarsely punctate, and with longer, differently punctured and differently margined abdomen.

STENUS INDISTINCTUS, n.sp.

Shining; very finely pubescent. Black; legs brown, base of femora yellow; palpi very pale.

Head finely punctate in median impression, more coarsely at sides. *Prothorax* rather densely punctate, punctures somewhat smaller and sparser on disc than elsewhere; base slightly wider than apex. *Elytra* scarcely longer than prothorax; densely and coarsely punctate; apex widely emarginate. *Abdomen* with basal segments moderately, 2nd feebly margined; five basal segments rather sparsely punctate, punctures moderately distinct. *Legs* long; femora slightly thickened; tarsi simple. Length to apex of elytra 2¼, of abdomen 5¼ mm.

Hab.—Clarence River, N.S.W.

Remarkably close to *olivaceus*, Macleay, but having only two of the abdominal segments margined; it is also rather more stoutly built and with a shorter prothorax.

STENUS VILLOSIVENTRIS, n.sp.

Shining; abdomen with long, thin, straggling whitish hairs. Black; prothorax deep blackish-blue, elytra with a bronzy tint in middle, sides bluish; legs dark brown, base of femora pale; antennæ almost entirely black; two apical joints of palpi black.

Head rather finely but deeply punctate; with a moderately distinct impunctate median ridge and several feebler ones at sides. *Prothorax* moderately densely and almost regularly punctate; apex narrower than base; base with a very feeble transverse impression. *Elytra* longer than prothorax, rather coarsely and densely punctate, apex widely emarginate. *Abdomen* with basal segment strongly, the 2nd very feebly margined; basal segment densely and strongly punctate, 2nd and 3rd moderately so, 4th and 5th

heavily punctate. Legs long, femora, especially the apical two-thirds, very simple. Length to apex of elytra 2½, of abdomen 2¼ mm.

Hab. Windsor, N. S. W.

Numerous specimens obtained during a flood in the Hawkesbury River. This species very strongly resembles Olisthopus Macleayi, from which, however, its black palpi will at once serve to distinguish it, that species (as noted by M. Fauvel) having pale palpi, it also differs in the margining of the abdominal segments. My specimens were compared with all the types of Macleay's Ceylonese fauna, so that I can be certain that the species was not described by him. From the description of Olisthopus, Fauvel, it differs in colour and punctuation, and M. Fauvel could scarcely have omitted mentioning the long and distinct abdominal clothing.

Olisthopus lanthinipennis, n. sp.

Narrow, finely pubescent. Black; elytra violet, abdomen with a violet gloss, legs yellow, apical half of femora, apex of tibiæ and tarsi infuscate, antennæ pale, apical joints infuscate; palpi very pale.

Head finely punctate; a longitudinal excavation in middle, carinate on each side behind antennæ. Antennæ extending

STENUS GAYNDAHENSIS, Macl. Specimens compared and agreeing with the types of this species agree exactly with the description of *obesulus*, Fauvel. I have specimens from the Tweed, Richmond, Clarence and Hawkesbury Rivers and also from Sydney.

S. MACULATUS, Macl. *Hab.*—Tweed, Richmond and Clarence Rivers, Galston, N.S.W.

S. CUPREIPENNIS, Macl. *Hab.*—Hawkesbury River, N.S.W.

S. OLIVACEUS, Macl. *Hab.*—Brisbane; Tweed, Richmond and Clarence Rivers, N.S.W.

S GUTTULIFER, Waterh. *Hab.*—Donnybrook, Bridgetown, W.A.

S CERULEUS, Waterh. *Hab.*—Tweed and Clarence Rivers, N.S.W.

TROGOSITIDÆ.

PHYCOSECIS.

Mr. Pascoe in describing this genus referred it to the *Tenebrionidæ*. Mr. Champion states that it belongs to the Clavicornes "near *Trogositidæ* or *Cucujidæ*." He is certainly correct as to its being a Clavicorn genus. Mr. Masters in his Supplementary Catalogue places it in the *Trogositidæ*, in which family (as it appears in a number of details to be allied to *Leperina*) I am content to leave it.

PHYCOSECIS LITORALIS, Pasc.—I have specimens compared with the types of this species and others given to me by Mr. Masters (from whom Mr. Pascoe received the type specimens). I mention this because the species is anything but well described. Pascoe says "beneath the scales appear to be massed together in profusion." In all the specimens I have examined the scales on the under surface and legs are somewhat setose in character and are far less dense than on the upper surface. In living (and well-preserved) specimens the prothoracic scales are of a snowy whiteness in both sexes, those on the elytra being usually similar but l

densely in the males, however, the scales are sometimes sooty with a sprinkling of white scales. The elytra of the ♂ are dark red, of the ♀ pale brown; the abdomen is somewhat paler in the ♂ than in the ♀. Specimens may be taken occasionally under wood, but abundantly about plants growing just above high-water mark during the day they remain concealed just under the surface, but move about freely at night. I have taken specimens at Fremantle and Albany. The species does not appear to extend far north as Geraldton, as I have unsuccessfully searched for it on a number of occasions.

Pityoscelis glabrum, Pasc.—I have a specimen from Swan River agreeing with the description of this species originally described from Mauritius. It appears to be but slightly different from *P. ruficollis*, and is possibly only a variety.

PITYOSCELIS AMMOPHILUS, n. sp.

♂. Rather narrow, slightly convex. **Black**: prosternum and legs reddish. Prothorax densely clothed with large silvery scales; median patch at apex greyish; elytra with short, stout, erect scales in regular lines not concealing derm; prothorax and elytra fringed with white erect scales; under surface, legs and antennæ sparsely clothed with whitish scales.

This species is at once distinguished from *litoralis* by the clothing of the upper surface being of two kinds; the elytral clothing is partly erect. It also differs in its much smaller size, narrower and slightly more convex form, shorter legs, and by the produced portion of the prothorax being narrower and more convex. I have taken numerous specimens just under the surface about beach-growing plants, and an occasional specimen under seaweed.

COLYDIIDÆ.

DERETAPHRUS ANALIS, n.sp.

Shining; black, under surface piceous-black, tarsi and apical joint of antennæ dark reddish-brown.

Head sparsely and very minutely punctate; clypeal suture almost obsolete. *Prothorax* elongate, fully twice as long as wide; very minutely punctate, punctures even smaller than on head; with a deep, sharply defined longitudinal canal not open at base and terminated at about one-fifth from apex, and divided into two parts of which the apical is slightly more than one-third the length of the basal part; base rounded on each side. *Elytra* smooth; the suture, 3rd, 5th and 7th interstices raised at base and apex, very feebly so elsewhere; sides impunctate, towards base and apex feebly striate-punctate, punctures elsewhere very feeble, interstices impunctate. *Under surface* sparsely and minutely punctate; apical segment densely punctate and on each side with a distinct subtriangular depression conjoined at apex Four anterior *tibiæ* with two small subtriangular granules invisible from most directions. Length 10, width $2\frac{3}{5}$ mm.

Hab.—Tweed and Richmond Rivers, N.S W.

A very distinct species on account of its almost impunctate surface, long and deeply channelled prothorax, and apical segment of abdomen. A number of specimens were obtained under the bark of rotting logs. My smallest specimen measures but 7 mm *D. Bakewelli*, Pascoe, which it much resembles, has moderatel strong elytral punctures with somewhat different interstices.

DERETAPHRUS XANTHOGRAMMA, n. sp.

Less polished than the preceding, dark reddish piceous, under surface slightly paler, legs and apical joint of antennæ reddish brown.

Head not very densely or coarsely punctate, neck feebly punctate, clypeal suture feebly marked. *Prothorax* subcordate with slightly larger punctures than on head; longitudinal canal not very deep, open at the base, slightly interrupted at its apex and about apex rather strongly punctate, dividing space feebly punctate, each side of base transversely depressed. *Elytra* with the 3rd 7th interstices narrowly raised in the middle and keel like for almost their entire length the ridges shining; each elytron with about seven rows of moderately strong punctures and some feebler rows at sides; sutural interstices each with an indistinct row of minute punctures. *Under surface* rather sparsely and minutely punctate, punctures moderately strong on prosternum especially on the flanks, stronger at base than at apex of metasternum, apical segment of abdomen densely punctate, apex truncately excised in ♂, subtriangularly in ♀. Outer edge of four anterior *tibiæ* each with three minute projections, invisible from one direction. Length 9½, width 2½ mm.

Hab. Swan River, Challow's Well, Pingarrah, W.A.

Specimens may frequently be obtained from the dead crown of

and twice its length; subcordate; longitudinal canal shallow, not divided into two parts; densely and strongly punctate, especially in middle and at sides of base. *Elytra* with the 3rd, 5th and 7th interstices raised, keel like and shining; each elytron with nine rather strongly punctate striæ, alternate interstices each with a row of fine punctures, the 5th produced forwards as if to clasp the prothorax, the 3rd and 5th conjoined at apex. *Under surface*, especially the prosternum, rather strongly punctate; apical segment of abdomen rather densely punctate, without lateral or apical impressions. Outer side of four anterior *tibiæ* with two scarcely visible projections. Length 9, width 2½ mm.

Hab. Swan River, W.A.

This species may be recognised by its shallow and undivided prothoracic canal, small head, wide elytra, and by its prothorax being more heart shaped than is usual in the genus. In appearance, except for the prothorax, it resembles *fossus*, Newman, or *Pascoei*, Macleay.

DERETAPHRUS PUNCTICOLLIS, n.sp.

Moderately shining, sides of elytra feebly so; dark reddish brown; elytra, legs and antennæ somewhat paler.

Head densely and coarsely punctate, punctures encroaching on neck, clypeal suture slightly depressed, marked with depression at sides and middle. *Prothorax* not much wider at apex than at base, densely and coarsely punctate, punctures larger than on head, largest about longitudinal canal which is shallow and irregular, and not divided into two distinct parts. *Elytra* with the 3rd, 5th and 7th interstices strongly and narrowly raised or keel like, the alternate interstices not at all raised and scarcely visibly punctate and appearing merely as interspaces between rows of rather strong punctures. *Under surface* rather strongly punctate, punctures smaller and deeper on pro- than on metasternum. Four anterior *tibiæ* with their outer curve scarcely interrupted by minute projections. Length 8½, width 2 mm.

Hab. Queanbeyan, N.S.W.

striæ, and the prothoracic groove ovate; in this species the enclosed space is almost parallel-sided, subtruncate at base and notched at apex.

BOTHRIDERES INTERMEDIUS, n.sp.

Shining all over; reddish-brown, elytra, except the suture occasionally, and legs paler.

Head coarsely punctate; clypeal suture moderately distinct, with several very feeble longitudinal impressions. *Prothorax* slightly longer than wide, apex considerably wider than base, anterior angles prominent; densely and rather coarsely punctate; disc with two distinct deep semicircular impressions, of which the posterior opens out to base, the two feebly connected on each side, the enclosed space less punctate at base and apex than in middle. *Elytra* with the 3rd interstice feebly raised at base and apex, flat elsewhere, 5th and 7th feebly raised and keel-like; striæ narrow, punctures distinct only at sides and apex, suture and 3rd interstice feebly punctate, 2nd with two or three minute punctures. *Under surface* with prosternum moderately strongly punctate, the punctures from thence decreasing in size and number to penultimate segment of abdomen; apical segment densely punctate, feebly depressed in middle. Length 6, width 2; variation in length 4½-6½ mm.

Hab.—Swan River, W.A.

This species may fairly be regarded as being intermediate between those in which the prothorax has a deep channel isolating a median space and those with an impression at each end.

BOTHRIDERES USTULATUS, n.sp.

Shining; red; undersurface slightly darker; muzzle, elytral suture and knees tinged with piceous.

Head densely punctate, punctures rather small and longitudinal; clypeal suture very indistinct. *Prothorax* slightly transverse, much wider at apex than at base, anterior angles rounded, densely punctate, punctures narrow and longitudinal; disc with two rather

dilutius piceum." *B. Mastersi*, Macleay, is possibly synonymous, but if the quoted remarks are constant it should be distinct. *B. rectangularis*, Macleay, appears to be allied.

BOTHRIDERES MASTERSI, Macl.—I have numerous specimens from New South Wales which were compared and agree with the types. The species is variable in colour; in some specimens the head and prothorax are no darker than the elytra and these have the suture but slightly darkened; in none of my specimens could the head be called "black." The size is very variable.

BOTHRIDERES VITTATUS, Newm.—Common and widely distributed in New South Wales and Western Australia. I regard *suturalis*, Macleay, of which I have a specimen from the Richmond River, as a small and pretty variety of this species.

BOTHRIDERES MERUS, Pasc.; B. MUSIVUS, Pasc.—I am not at all sure that these names appertain to two distinct species, or whether there is but one which is very variable in regard to size and to a certain extent in colour. The specimens which I label *merus* and a specimen so labelled by the Rev. T. Blackburn are larger and duller than those which agree best with the description of *musivus*, but the reverse should be the case. I have specimens from New South Wales, Victoria, and South-Western Australia.

BOTHRIDERES EQUINUS, Pasc.—I have specimens agreeing with the description of this species which were compared and agree with the type of *B. Pascoei*, Macleay.

BOTHRIDERES TÆNIATUS, Pasc.—Of this species Mr. Pascoe says "prothorax with two deep semicircular impressions, *the space between not punctured in the centre*." I have only one specimen agreeing with the italicised remark, but have numerous others agreeing in all other details, and think that it is but an accidental variation; the sutural marking appears to be liable to obliteration. *B. Kreffti*, Macleay, is possibly synonymous.

BOTHRIDERES ILLUSUS, Newm.—Mr. Pascoe includes this species in the group having but one strongly marked prothoracic impres-

sion; this must certainly be a mistake, as Mr. Newman describes it as having two; it is possibly Pascoe's *equinus* or *senilis*.

PENTHELISPA RUFIVA, n. sp.

Highly polished; piceous-red or reddish piceous, apical joints of antennæ and elytra red, the latter with the sutures, or the suture and 1st, or 1st and 2nd interstices tinged with piceous.

Head densely punctate; a deep round punctate fovea on each side between eyes and antennæ. Antennæ short, thick, not extending to anterior ocelli. *Prothorax* longer than wide, no little wider in front than behind, the anterior angles slightly produced, the posterior rounded; moderately densely and strongly punctate; with a narrow impunctate space along the median line, on each side of which is a very shallow impression. *Scutellum* transverse, impunctate. *Elytra* slightly wider than prothorax, parallel-sided to near apex; suture wide, slightly widening to and depressed at base, with a row of extremely minute punctures; striate-punctate; punctures moderately large but obscure; interstices rounded, impunctate. *Under surface* strongly but not densely punctate, apical segment of abdomen transversely ocellate. Length 3½-4, width 1⅔ mm.

Hab. Tweed River, Glen Innes, Forest Reefs, Clifton, Windsor, Sydney, N.S.W.

A very highly polished species of somewhat variable colour

and rather densely punctate, a distinct and closely punctate depression traceable on each side of a median line to base; median line impunctate in middle, punctate at base. *Scutellum* small, transverse, almost impunctate. *Elytra* parallel-sided to near apex; strongly striate-punctate; interstices, except suture, narrow, very minutely punctate and with their sides slightly encroached upon by the punctures in striæ. *Under surface*, especially prosternum, densely and strongly punctate; apical segment of abdomen transversely concave. Length 3, width ¾ mm.

Hab.—New South Wales.

Readily distinguished from the preceding species by its darker and uniform colour, differently shaped frontal foveæ, depressions on prothorax, and stronger puncturation. I have two specimens which were probably obtained in the vicinity of Sydney.

PENTHELISPA OBSCURA, Pasc.

I have two specimens (from New South Wales) agreeing with the description of this species except that the prothorax has not "the longitudinal impressions on the disc almost obsolete," but on the contrary well-marked; but as of *fuliginosa* (a closely allied species) I have specimens with these impressions well-marked and others with them almost obsolete; this may be a character liable to variation.

P. SECUTA, Pasc. *Hab.*—Mt. Kosciusko, N.S.W.

P. FULIGINOSA, Erichs. *Hab.*—Tasmania

I have another species from Western Australia, but as it is represented by an unique specimen only, I refrain from describing it.

GEMPYLODES TMETUS, Oll.—Mr. Olliff records this species from Maryborough, Q., as well as from Lord Howe Island. I have taken several specimens on the Richmond River.

EUCNEMIDÆ.

DYSCOLOCERUS BASALIS, Lea.—In describing this species I remarked that it was possibly a small male of *D. heros*. I have

dense; in the males, however, the scales are sometimes sooty w
a sprinkling of white scales. The elytra of the ♂ are dark bro
of the ♀ pale brown; the abdomen is somewhat paler in the
than in the ♂. Specimens may be taken occasionally under
weed, but abundantly about plants growing just above high-w
mark; during the day they remain concealed just under
surface, but move about freely at night. I have taken speci
just under the surface several yards away from any plant bet
Fremantle and Albany. The species does not appear to ex
so far north as Geraldton, as I have unsuccessfully searched
for it on a number of occasions.

PHYCOSECIS ALGARUM, Pasc.—I have a specimen from Sy
agreeing with the description of this species (originally descr
from Melbourne). It appears to be but slightly different f
litoralis and is possibly only a variety.

PHYCOSECIS AMMOPHILUS, n.sp.

♂. Rather narrow, slightly convex. Black; prosternum
legs reddish. Prothorax densely clothed with large silvery s
a roundish patch at apex greyish; elytra with short, stout, s
silvery scales in regular lines not concealing derm; prothora
elytra fringed with white setose scales; under surface, leg
head with sparse short whitish setæ.

Head densely punctate, feebly longitudinally

Head minutely punctate. Rostrum very short. Antennæ extending beyond posterior coxæ, flattened; 1st joint obtriangular, distinctly shorter than 3rd, 2nd concealed, 3rd-10th serrate, 3rd slightly longer than 2nd, 2nd-10th subequal, 11th elongate. *Prothorax* seven-areolate; scarcely transverse; base distinctly wider than apex, bisinuate, middle notched; posterior angles acute; sides strongly lessened to middle. *Scutellum* oblong, grooved, sides incurved near apex, apex emarginate. *Elytra* wider than prothorax, increasing in width to apex; each with four costæ of which the 2nd and 4th are thicker, though not so thick as the margin; interspaces with two series of comparatively small punctures, near margin distinct to apex, the others in two series only near base, becoming very irregular from near middle to apex. Penultimate segment of abdomen rather feebly incised. Length 11, width 4¼ mm.

Hab.—Sydney, N.S.W.

Differs from *M. lugubris* in being larger, prothorax bicoloured and elytra somewhat differently coloured: from the description of *M. monticola*, to which species it is perhaps closer, by the elytral puncturation less coarse than in *M. erythropterus*, and extremely irregular, apparently in a different fashion to that of *M. monticola*; the black elytral patch (perhaps, however, variable) is different from that of *M. monticola*, which Mr. Blackburn says "is of a width to include two costæ;" in this species it includes four, and is sharply defined except towards the apex.

METRIORRHYNCHUS CŒNOSUS, n.sp.

♂. Sooty-black; sides of prothorax, margins and extreme apex of elytra yellowish; yellow produced on suture for about one-tenth its length and for about the same length on 2nd costa; under surface of 1st antennal joint and trochantins obscure testaceous. Face with whitish pubescence.

Head with a transverse foveate impression between eyes. Rostrum very short. Antennæ rather short, 1st joint distinctly shorter than 3rd, 2nd concealed, 3rd-10th serrate, 3rd-8th sub-

brown.

Head not very densely or coarsely punctate, r
punctate; clypeal suture feebly marked. *Prothorax*
with slightly larger punctures than on head; longitu
not very deep, open at the base, slightly interrupted
and about apex rather strongly punctate, dividing
punctate, each side of base transversely depressed.
the 3rd-7th interstices narrowly raised in the middl
like for almost their entire length, the ridges shining;
with about seven rows of moderately strong punctur
feebler rows at sides, sutural interstices each with a
row of minute punctures. *Under surface* rather s
minutely punctate, punctures moderately strong on
especially on the flanks, stronger at base than at ap
sternum; apical segment of abdomen densely pun
triangularly excised in ♂, subtriangularly in ♀. Ou
four anterior *tibiæ* each with three minute projectio
from most directions. Length $9\frac{1}{2}$, width $2\frac{1}{6}$ mm.

Hab.—Swan River, Chidlow's Well, Pinjarrah, W.

Specimens may frequently be obtained from the dea
various species of *Xanthorrhœa* and occasionally f
situations in *Kunzia australis*. The size, and to a ce
the colour, are variable. The species is moderately close
Pascoe, from which it differs in its finer punctura
interstices, but especially by the apical segment of ab

rather feeble costæ, the interspaces with double series of regular subquadrate punctures, separated by lines almost equal to the costæ. Length 9, width $2\frac{2}{3}$ mm.

Hab.—Barron Falls, Q. (Mr. A. Koebele).

This species would belong to Mr. Waterhouse's genus *Cladophorus*. Of the three species referred by Sir Wm. Macleay to that genus it appears to be closest to *posticalis*, but differs from the description of that species in having the disc of prothorax black and basal five-sixths of elytra red. There also appear to be differences in the antennæ.

METRIORRHYNCHUS TOGATUS, Waterh.—I have three males from Albany and Mt. Barker which agree with the figures and description of this species, except that they are smaller ($3\frac{1}{2}$-$4\frac{1}{3}$ mm.). The head behind the eyes has a deep semicircular impression which may appear "utrinque foveâ magnâ nitidâ" from some directions. Probably, however, the specimens, which in colour much resemble *M. clientulus*, belong to an undescribed species.

METRIORRHYNCHUS LAETUS, Blackb.—I have numerous specimens of this species from Galston. The black markings on the elytra are variable and occasionally are almost absent.

M. ELEGANS, Waterh. *Hab.*—Tamworth, N.S.W.

M. TEXTILIS, Waterh. *Hab.*—Brisbane, Q.

M. FALLAX, Waterh. *Hab.*—Barron Falls, Goondi River, Q.

M. CLIENTULUS, Waterh. *Hab.*—Clarence River.

M. LUGUBRIS, Waterh. *Hab.*—Sydney.

M. IRREGULARIS, Waterh. *Hab.*—Gosford, N.S.W.

M. SALEBROSUS, Waterh. *Hab.*—Tasmania, New South Wales.

M. LATERALIS, Redt. *Hab.*—Sydney, Como, N.S.W.

M. ERYTHROPTERUS, Erichs. *Hab.*—New South Wales, Tasmania, S. W. Australia.

M. RUFIPENNIS, Fab. *Hab.*—Sydney, &c.

M. MARGINICOLLIS, Macl. *Hab.*—Tamworth.

M. (TRICHALUS) RAYMONDI, Lea. *Hab.*—Forest I

M. (TRICHALUS) AMPLIATUS, Waterh. *Hab.*—E
Tweed, Richmond and Clarence Rivers, N.S.W.

M. (XANTHEROS) NUBICOLLIS, Fairm. *Hab.*—Que

CALOCHROMUS AMABILIS, n.sp.

♂. Black; basal two-thirds of elytra of a reddish-o
apical third violet-black, the markings briefly triai
duced on suture, mandibles testaceous. Elytra de
with short pubescence similar in colour to the derm
rests; legs and antennæ with short greyish pubescen
almost impubescent and shining.

Head minutely punctate; a feeble longitudinal ir
vertex, increasing to a deep groove between antenna
extending to apical marking on elytra; thick; 1st j
than 2nd-3rd, these small especially the 2nd, 4th-10
slightly serrate internally, 11th elongate. *Protho*
wider than head, transverse; base and apex almost tr
feebly incurving to middle, base slightly wider tha
with a deep elliptic impression open at apex and les
so at base, sides concave, margins thick. *Scute*
oblong, sides and apex straight, longitudinally groo
wider than prothorax, feebly increasing to near ap
punctate, regularly striate; each with about twel
convex interstices. Penultimate segment of abdo
incised. Length 5⅔, width 1⅞ mm.

Very distinct from all previously described species, and easily identifiable by its very flat form and beautiful colour. The elytral striation and punctures somewhat resemble those of *C. Guérinii;* the colour is somewhat like that of *C. basalis*, and the antennæ are considerably thicker than those of *C. insidiator*.

CALOCHROMUS BREVICORNIS, n.sp.

♂. Head, antennæ, under surface and legs sooty-black; prothorax, scutellum, elytra (except extreme apex), apex of coxæ and base of femora beneath yellow, prothorax tinged with red. Elytra densely clothed with short pubescence; sides of prothorax, antennæ, under surface and legs feebly pubescent.

Head feebly punctate, a wide shallow groove between eyes. Rostrum very short. Antennæ scarcely extending to posterior coxæ, 1st joint thick, as long as 3rd, 2nd small, round, moderately distinct, 3rd-5th serrate internally, 3rd-11th gradually decreasing in width, and 4th-11th in length. *Prothorax* scarcely transverse, sides incurved to middle, apex rounded, base feebly bisinuate, feebly notched in middle, notch invisible from above, slightly wider than apex, posterior angles subobtuse; disc with a rather shallow groove at base connected with apex by a feeble ridge; sides, especially at base and apex, deeply impressed. *Scutellum* transverse, apex semicircularly emarginate. *Elytra* slightly wider than prothorax, very feebly increasing to near apex; densely and regularly punctate, punctures moderately round, subapproximate; each elytron with ten rounded scarcely raised interstices, subcostate near base. Penultimate segment of abdomen feebly incised. Length 7¾, width 2⅛ mm.

♀. Differs in having shorter and thinner antennæ, smaller eyes, prothoracic impression shallower, and simple abdomen.

Hab.—Galston, N.S.W. (Dumbrell and Lea).

The disc of the prothorax could scarcely be called five-areolate. It is not close to any species with which I am acquainted except the following.

CALOCHROMUS PILOSICORNIS, n.sp.

♂. Colour and clothing as in preceding, except that the antenn are more densely pubescent.

Head polished, a deep fovea between antennæ. Antennæ c siderably longer than in preceding, 2nd joint smaller, 3rd-1 rather strongly serrate internally, 4th-10th subequal, 1 slightly longer than 10th. *Prothorax* much as in preced except that the impressions are shallower, the median one lon and the lateral impressions interrupted by a feeble ridge in middle. *Scutellum* scarcely transverse. *Elytra* as in preced except that the interstices are a little more irregular and punctures larger and rounder. Penultimate segment of abdo sharply triangularly incised. Length 6, width 2 mm.

Hab.—Barron Falls, N.Q (Mr. A. Koebele).

This species strikingly resembles the preceding, but the ante are so dissimilar as to preclude the supposition that it is a var of that species.

CALOCHROMUS GUERINII, Macl.—This species is somew variable in regard to colour and size. I have taken specim on the Tweed River which were carefully compared, agree, with the type specimens, and to which the descriptio M. Léon Fairmaire's *C. discicollis* exactly apply; the latter n must therefore fall.

side or suture; median red fascia dilated at sides and suture. Meso- and metasternum black; abdomen yellow with sooty spots at sides, base of anterior femora testaceous. Rather sparsely clothed with suberect pubescence.

Head densely and rather coarsely punctate; clypeal suture feeble. Basal joint of antennæ large, swollen at apex; 2nd large, irregularly quadrate, convex below, concave above, inner margin with two small teeth or nodes, the basal one sharp, apical one obtuse. *Prothorax* slightly longer than wide, apex rounded, considerably wider than base; a transverse depression near base. *Scutellum* small, transverse, punctate. *Elytra* not much longer than head and prothorax combined, dilated from near base, sides and suture rather strongly raised and thickened, a feeble impression between shoulder and scutellum; moderately and equally punctate throughout. Length $2\frac{1}{2}$, width $1\frac{1}{3}$ mm.

Hab.—Gosford, N.S.W.

This is the only species I have seen belonging to the 1st section. It appears to resemble *L. guttulatus* (apparently described from female specimens), but differs in the median elytral fascia being continuous and similar in colour to the apex, with which it is connected along suture, and apparently in several other particulars.

*Prothorax distinctly transverse.**

Prothorax red, immaculate.

LAIUS CYANOCEPHALUS, n.sp.

♂. Head blue; antennæ blackish, basal joint with a bluish gloss, 2nd testaceous at base; prothorax red; elytra with a rather broad yellow median fascia dilated at sides and suture, apex with a yellow patch shaped as an equilateral triangle; basal marking large, green, becoming violet at apex; apical patch violet-blue. Sterna and tibiæ green, abdomen and femora blue. Clothed with moderately long brownish hair, shorter and sparser on apex of elytra than on base, the prothorax, and head.

* M. Fairmaire's 2nd section.

and coarsely punctate, a distinct impression on e
tinued to and meeting in middle of base. Sc
transverse, feebly punctate, transversely impres
Elytra slightly widened to apex, almost twice the l
and prothorax combined; densely and coarsely pu
about scutellum and on apical two-fifths; sides and
and thickened, less noticeably at apex than in middl
width 2 mm.

Hab.—Whitton, N.S.W.

Not having proof positive of the sexes, I canno
females, though I probably possess them; I have tw
were swept out of long grass.

LAIUS CARUS, n.sp.

♂. Head black, muzzle pale yellow; antennæ bl
joints pale yellow but marked inwardly with bla
red; elytra with basal patch large, rounded in mid
outwardly, of a beautiful pale metallic-green, beco
apex; median fascia pale yellow, slightly dilated
more noticeably at sides, and continued along s
where it opens out somewhat irregularly, a large
rounded patch near apex touching side but not su
surface and legs black, anterior femora testaceous
anterior tibiæ testaceous on apical half. Upper

below, concave above, inner margins with obscure teeth, joined to 1st joint at inner edge, to 3rd at outer edge. *Prothorax* transversely subcordate, scarcely visibly punctate, a shallow impression near base behind which there is a feeble irregular ridge. *Elytra* twice the length of head and prothorax combined, slightly and regularly dilating to near apex; very feebly punctate except in median fascia which is moderately punctate; sides and suture raised and thickened except at base and apex; a very feeble impression within shoulder. *Legs*, especially the posterior, unusually long and thin; anterior femora largely excavated at apical third. Length 2½, width 1⅓ mm.

Hab.—Behn River, E. Kimberley, W.A. (Mr. R. Helms).

A very pretty little species of which I have seen only the male. The anterior femora are more excavated than in *L. femoralis*, Blackb., the only other species I have seen possessing this character.

LAIUS PALLIDUS, n.sp.

♂. Of a uniform pale reddish colour; elytra with a moderately large black patch at the base narrowed at suture and sides, and with a feeble lessening of colour behind shoulder; near apex with a large rounded black patch on each side and not touching side or suture. Metasternum black. Upper surface with sparse, short, decumbent golden hair, sparsest on prothorax.

Head finely punctate, with a feeble longitudinal groove. Basal joint of antennæ slightly longer than 2nd, suddenly swollen towards apex; 2nd irregular, convex below, scarcely concave above, with two distinct teeth (invisible from some directions), one pointed outwards, the other directed towards 3rd joint, swollen portion more inside than outside a straight line connecting 1st and 3rd joints. *Prothorax* feebly punctate; apex scarcely wider than base, transversely depressed near base. *Elytra* convex, not once and one-half longer than its greatest width; feebly punctate, sides and suture raised and thickened except at apex, spaces between shoulders and suture slightly raised. Length 2¼, width 1⅓ (vix) mm.

♀. Differs in having the basal joint of antennæ smaller and 2nd simple; elytra wider, scarcely raised between shoulders suture; markings brown, the basal almost obsolete (anothe however, resembles it in this respect), depression at base of thorax shallower, and posterior tibiæ straighter and thinner.

Hab.—Geraldton, W.A.

A pretty little species somewhat resembling *Aulacop hilaris* in miniature.

LAIUS EGENUS, n.sp.

♀. Head black; antennæ black, four basal joints pale; thorax red; elytra with basal patch violet-blue; median fa yellow, narrow in parts and strongly dilated at sides and sut appearing almost as three diamond-shaped spots; apical two-fi deep violet. Under surface and legs black; abdomen s extreme base of femora obscurely tinged with yellow. Head sides of elytra with sparse straggling hair, almost glabrous where.

Head finely punctate, with a feeble longitudinal gr suddenly deepened on clypeus. Basal joint of antennæ cur somewhat swollen at apex, the length of 2nd-3rd combined: almost the length of 3rd-4th combined. *Prothorax* finely punc on sides, almost imperceptibly on disc, feebly depressed near l *Scutellum* transversely triangular, longitudinally impressed

red, with a moderately large subquadrate black patch not extending to apex, narrowed towards and then slightly dilated at base; elytra violet-blue, median fascia as in preceding; apex with a transverse red patch, rather narrow at sides and dilated at suture. Under surface and legs black, prosternum and anterior legs (except coxæ) red. Upper surface (except disc of prothorax) rather densely clothed with erect brownish hair.

Head rather coarsely punctate, clypeus with a highly polished depression on each side. Basal joint of antennæ elongate, curved, apical two-thirds greatly swollen, the swelling commencing rather abruptly, 2nd joint irregularly oblong or wedge-shaped, transverse, convex below, grooved above, the groove commencing at a line between 1st and 3rd joints, the greater portion of the joint inwards and directed upwards. *Prothorax* not wider at apex than base; sides densely but almost obsoletely punctate, disc almost impunctate; transversely depressed near base, base in middle with an irregular feeble elevated ridge. *Scutellum* subquadrate, sides and apex feebly incurved. *Elytra* not twice the length of head and prothorax combined; densely and coarsely punctate in middle, the punctures slightly continued on blue markings; sides and suture raised and thickened, the thickening rather abruptly terminated near apex. Anterior femora with a feeble oblique groove at the base beneath. Length 4½, width $2\frac{2}{3}$ mm.

Hab.—Forest Reefs, Queanbeyan, N.S.W.

Three males under examination. I probably have females, but cannot distinguish them.

Laius planiceps, n.sp.

♂. Head deep blue, muzzle bordered with yellow; antennæ black, two basal joints red, the basal tinged with brown; prothorax red with a large median black patch not extending to apex and slightly dilating towards base; elytra of an obscure violet; median fascia yellow, rather wide, dilating towards suture and sides; apex with a yellow transverse patch, narrow at sides,

widening somewhat obliquely to suture. Under surface and leg black, abdominal segments margined with yellow. Upper surface rather sparsely clothed with suberect, brownish hairs.

Head scarcely visibly punctate; obliquely flattened behind, perpendicularly in front, the face from some directions appearing feebly concave. Basal joint of antennæ shorter than 2nd, with a rather strong tooth at its outer apex; 2nd large, longer than wide, seen from below much wider at apex than base, apex rounded, sides oblique, base truncate, beneath convex, above deeply and irregularly concave, an obtuse tooth close to 3rd joint. *Prothorax* more transverse than is usual; very feebly punctate at sides; transversely depressed at base, each side of base in middle with a very feeble transverse elevation. *Scutellum* depressed at apex. *Elytra* with minute punctures throughout, and with an appearance as of small flattened almost obsolete granules scattered about; sides feebly thickened, suture still more feebly. Length 4, width 2 mm.

Hab.—Whitton, N.S.W.

Appears to be close to *L. rugulipennis*, but the following remarks in the description of that species do not apply to my unique specimen:—"Capite punctulato, inter oculos transversim impresso summo sulcatulo; elytris grosse parum dense punctatis basi apiceque multo minus; pedibus anticis testaceis."

seen from behind appearing somewhat like a short, broad M, apex with a red transverse patch narrowed at sides, wide near suture. Under surface blue-black, abdominal segments bordered with pale yellow; legs red, four posterior femora black, posterior tibiæ and tarsi tinged with brown. Head with brown suberect hair, sides of prothorax with decumbent golden hair, sides and base of elytra with rather dense, comparatively short, erect brown hair.

Head irregularly transversely corrugate, an irregular fovea between eyes, clypeus irregular. Basal joint of antennæ considerably longer than 2nd, swollen towards apex, apex almost truncate or feebly emarginate, joined to 2nd at its outer edge, inner edge projecting; 2nd deeper than its length or width, length greater than depth, inner face convex, outer concave towards apex, top with two obscure teeth or nodes, one at each end. *Prothorax* with shallow scattered punctures at sides and base; base and apex equal in width; feebly transversely depressed near base. *Scutellum* transverse, punctate, sides oblique, apex truncate. *Elytra* about twice the length of head and prothorax combined, at base not much wider than prothorax, feebly widened to near apex; median fascia densely and rather coarsely punctate, the punctures encroaching on violet markings, especially at the sides; sides and suture raised and thickened except near apex. Anterior femora less thick than is usual. Length $6\frac{1}{3}$, width $2\frac{5}{6}$ mm.

Hab.—Beverley, W.A.

This species, of which I have an unique male specimen under examination, differs from *L. plagiaticollis* in having the two projections on the 2nd antennal joint very small and equal, the face with five spots, two near the eyes being longitudinal, two on the disc transverse, and the 5th between the eyes and scarcely traceable. The size and shape of the prothoracic and elytral markings are also different. It is certainly not a variety of that species.

LAIUS NIDICOLA, n.sp.

♂. Head blackish-blue, muzzle narrowly bordered with ye antennæ black, apex of 1st joint and base of 2nd obsc marked with yellow; prothorax red, a large black blotch in m not continued to base or apex, and with a fuscous extensio each side and on each side of base; basal portion of elyt a metallic blue shading off to violet; median fascia red, n narrow and waved, slightly dilated at sides and suture; sub patch large, violet-blue; apex with a small subtriangular patch. Blue beneath, abdominal segments bordered with ye legs black. Upper surface moderately densely clothed with brown hair.

Head rather finely punctate; vertex with a semicircular r a round fovea between eyes; clypeus feebly concave. Basal of antennæ slightly longer than 2nd, swollen at apex; 2nd lo than wide, slightly wider at apex than base, convex below, gro above, the groove rising to middle where it is very shallow, connected with 1st joint slightly towards its inner edge n than in middle. *Prothorax* distinctly wider at apex than b sides coarsely punctate; near base transversely depressed, side of base in middle raised and thickened. *Scutellum* transv apex feebly rounded. *Elytra* dilated from near base; den

LAIUS INTERMEDIUS, n.sp.

♂. Colour and clothing as in preceding except that the head is blackish-green, the blotch on prothorax is smaller and rounded, the median fascia and the apical triangle of elytra are larger.

Head as in preceding, except that the fovea between eyes is larger and shallower; basal joint of antennæ as in preceding, 2nd longer than wide, convex below, above with a groove commencing at base continued almost to apex, then turned round and returning almost to base, an obtuse tooth or projection at the inner base, joined to 1st towards its outer edge. *Prothorax* and *elytra* as in preceding, except that the subapical violet patch on the elytra is punctate only at its extreme edge and the sutural thickening is less pronounced. Length 4½, width 2 mm.

♀. As in preceding species.

Hab.—Swan River, W.A.

In living specimens the blue markings are very bright and usually without a trace of violet tinge; the red is a bright scarlet. I thought it possible that the extraordinary shapes of the 2nd joint in the males of this genus were caused, or partially caused, by shrinkage after death. I cannot, however, see the slightest difference in living and dried specimens of the above species.

LAIUS ORCICORNIS, n.sp.

♂. Colour and clothing exactly as in preceding.

Head finely punctate; a rather large round fovea between eyes; clypeus feebly longitudinally impressed on each side. Basal joint of antennæ slightly longer than 2nd, less swollen and curved than in the two preceding species; 2nd joint barrel-shaped, a feeble groove at the base on its upper surface, joined to 1st in middle of base. *Prothorax* less transverse than in *nidicola*. Elytral puncturation as in *nidicola* but a little more irregular. Length 4½, width 2 mm.

♀. As in the two preceding species.

Hab.—Mount Barker, W.A. (Helms, Macsorley and Lea).

This and the two preceding species closely resemble each o in form, size, colour and puncturation, but may be distingu by the 2nd joint in the antennæ of the males; the females ap to be indistinguishable amongst themselves. They are c allied, but I do not think should be considered as one sp having several varieties; of each I have taken numerous specim and cannot see any variation in the 2nd joint.

LAICUS FEMORALIS, Blackb.—Of this species Mr. Black says: "But with the dark part of the elytra scarcely cyane I have two specimens which I think should be referred to species. In a male from Whitton the elytral markings are beautiful metallic blue. A male from Sydney has the a patch of a deep violet; the basal patch is violet at its apex blue at its base. I am inclined to think that *femoralis* (of w the ♀ is unknown) is the ♂ of *cinctus* (of which the unknown). I have two specimens carded together (but whe obtained *in cop.* or not I cannot now say) of which the certainly *femoralis*, and I cannot see any differences between ♀ and females identified as *cinctus* by both Mr. Blackburn myself: possibly, however, the males of both are distinct I inclined to doubt that *L. Mastersi* is a synonym of *cinctus*: unfortunate that both were described from females.

LAICUS PLAGIATICOLLIS, Fairm.—M. Fairmaire records species without exact locality. I have numerous

HYPATTALUS.

Elytra of uniform colour.

HYPATTALUS BREVICORNIS, n.sp.

Head, antennæ, under surface and legs black, prothorax red; elytra black, with a greenish or bluish gloss. Elytra rather densely clothed with short erect pubescence.

Head highly polished, scarcely punctate. Antennæ short, rather thick, joints 3rd-9th serrate internally. *Prothorax* transverse, briefly elliptic, base very slightly margined. *Scutellum* transverse, feebly depressed. *Elytra* subparallel to middle, feebly widening thence to near apex; minutely punctured throughout; suture not at all raised or thickened. Legs long and thin, posterior tibiæ curved at base. Length 2¼, width 1¼ mm.

Hab.—Galston, Armidale, N.S.W.

I cannot detect the sexes among seven specimens. This species differs from *H. australis* by its almost impunctate and more pubescent elytra, smooth suture, shorter antennæ, &c.

HYPATTALUS OCCIDENTALIS, n.sp. or var.

Head and legs black; antennæ black, basal joints tinged with red; prothorax red; elytra of a metallic blackish-green. Sterna deep bluish-black; abdomen red, two basal segments suffused with black, apical segment black. Elytra rather sparsely clothed with short suberect pubescence.

Head highly polished, finely punctate, with a feeble longitudinal groove which is deepened on clypeus. Antennæ rather short joints 3rd-9th serrate internally. *Prothorax* transverse, apex, truncate, base rounded and feebly margined. *Elytra* feebly increasing in width to apex, finely punctured throughout; sides and suture not at all raised or thickened. Length 2¼, width 1¼ mm.

Hab.—Bunbury, W.A.

Hypattalus longicornis, n.sp.

Head black, muzzle yellow; antennæ brown, three testaceous outwardly; prothorax red; elytra ob Under surface sooty-brown, metasternum with a apical segments of abdomen suffused with yellow in brown; coxæ, knees and apex of tibiæ paler. U clothed with short pubescence, dense and erect on and suberect on prothorax.

Head highly polished, vertex impunctate; with a tudinal groove, a feeble oblique groove on each median groove at base of clypeus. Antennæ long, middle of elytra, 1st joint considerably longer th slightly longer than 3rd, 3rd-4th equal, 5th-9th sligh in length, 10th slightly shorter than 9th and conside than 11th. *Prothorax* transversely suboblong, minu base margined, a narrow impression continuous with of margin. *Scutellum* raised, subtriangular, fine *Elytra* long, more than twice the length of head a combined, very feebly increasing in width to apex; rather strongly punctured throughout; suture and si thickened. Legs, especially tibiæ, long and thin, p almost straight. Length $3\frac{1}{4}$, width $1\frac{1}{3}$ mm.

Hab.—Queanbeyan, N.S.W.

HYPATTALUS COLLARIS, n.sp.

Black; prothorax with the sides yellow, the middle occupied by a broad almost parallel-sided patch reaching apex and base; elytra with a purplish gloss; abdominal segments margined with yellow. Elytra with short sparse suberect pubescence.

Head transverse, highly polished; vertex with a scarcely visible impression; clypeus with a feeble impression on each side. Antennæ short, 3rd-9th joints serrate internally. *Prothorax* transverse, briefly elliptic, scarcely punctate, base feebly margined. *Elytra* not twice the length of head and prothorax combined, feebly increasing in width to apex, minutely punctate, sides and suture not raised or thickened. Legs moderately long, posterior tibiæ feebly bent throughout. Length 2, width $1\frac{1}{3}$ mm.

Hab.—Galston, N.S.W. (Dumbrell and Lea).

Very distinct from any species here described. I have three specimens, the sexes of which I cannot determine.

Elytra not of uniform colour.

HYPATTALUS DISPAR, n.sp.

♂. Black, three basal joints of antennæ bordered with yellow prothorax red; elytra deep violet, apex narrowly margined with red. Apices of abdominal segments reddish. Elytra moderately densely clothed with short and very short erect pubescence.

Head transverse, highly polished, a distinct impression on each side in front. Antennæ moderately long, 3rd joint with an obtuse inner tooth, 4th-9th each with a tooth as long as or longer than the joint itself and each with a few hairs at its tip, tooth of 8th about the longest; 10th-11th elongate, subequal. *Prothorax* transverse, impunctate, apex truncate, base rounded and feebly margined. *Scutellum* transverse, feebly depressed longitudinally, apex feebly emarginate. *Elytra* about twice the length of head and prothorax combined, feebly increasing in width to near apex, finely punctate, sides and suture not at all thickened. *Legs* long, posterior tibiæ feebly bent throughout. Length $2\frac{3}{4}$, width $1\frac{1}{4}$ mm.

The only known species in the genus having pecti
in the male. I have a pair taken *in cop.*

HYPATTALUS VIRIDIS, n.sp.

Head deep black, with a purplish gloss; antenna
joints more or less suffused with yellow; prothorax
a deep rather dingy green, apex with a subtrian
patch. Under surface black; edges of abdomi
reddish; legs black, femora and tibiæ tipped with ye
almost wholly yellow. Elytra rather densely cloth
suberect pubescence.

Head transverse, highly polished, disc almost i
shallow punctate impression on each side of clypei
rather long, 7th 10th joints slightly serrate, 11th dis
than 10th. *Prothorax* transverse, apex and base
latter margined and narrower than apex. *Elytra*
once and one-half the length of head and prothor
feebly increasing to near apex, densely and moder
punctured except towards apex, suture almost
thickened. Legs long and thin, posterior tibiæ ra
curved. Length $2\frac{1}{3}$, width $1\frac{1}{3}$ mm.

Hab.—Tamworth, N.S.W.

Differs from the preceding by its more convex for
almost simple antennæ, and differently punctured el

HYPATTALUS VIOLACEUS, n.sp.

Head transverse, highly polished, almost impunctate, clypeus with a feeble impression on each side. Antennæ rather short, 3rd-9th joints feebly serrate internally, 11th almost twice the length of 10th. *Prothorax* transverse, briefly elliptic, base margined. *Scutellum* transverse, apex truncate. *Elytra* twice the length of head and prothorax combined, dilating from near base, very feebly punctate; suture very feebly thickened in middle, sides margined at apex. *Legs* rather long and thin, posterior tibiæ moderately curved throughout. Length 2¼, width 1⅓ mm.

Hab.—Tamworth, N.S.W.

I have eight specimens under examination; those I suppose to be males have the antennæ serrate; in the supposed females they are almost simple and slightly longer. In colour and clothing this species is closer to *H. dispar* than to the preceding.

Hypattalus pulcherrimus, n.sp.

♂. Head black with an obscure greenish tinge; antennæ black; prothorax black, sides red, the red narrowly marked at base, enlarging to apex; scutellum black with a bluish gloss; basal third of elytra red apical two-thirds (but not extreme apex) violet-blue, base of patch violet and briefly advanced on suture, apex with thickened portion red Under surface violet-black, abdomen red; legs black, with a greenish or bluish gloss. Elytra with brown pubescence short and suberect, and with longer erect and darker hairs scattered about.

Head highly polished, feebly punctate, clypeus with an irregular impression on each side. Antennæ rather long, 3rd-10th joints slightly serrate internally, 11th twice the length of 10th. *Prothorax* transverse, wider at apex than base, base margined and feebly incurved to middle. *Scutellum* small, sides oblique, apex truncate and depressed. *Elytra* more than twice the length of head and prothorax combined, feebly increasing in width to near apex, densely and rather strongly punctate on blue portion, less on base; sides and suture raised and thickened, especially at apex where the thickening is very pronounced and causes the apex almost to appear bifoveate. *Legs* long; anterior femora strongly

HYPATTALUS ALPHABETICUS, n.sp

black; antennæ brown, basal joints somewhat paler; x red; elytra with basal third violet, a large violet sub- pot on each side near apex touching the margin but not apex; a median and rather broad yellow fascia slightly at sides and continued along suture to apex, where it ut in a triangle, the whole yellow marking appearing as road-headed T. Under surface black; legs yellow, inter- femora with basal half black, posterior with knees black. parsely clothed with pale pubescence, elytra with additional berect and darker hairs.

strongly transverse, highly polished, feebly punctate, with longitudinal ridge, each side of clypeus with a feeble impression. Antennæ slender, extending to middle of ints 4th-7th very feebly serrate internally. *Prothorax* e, apex wider than base, base rounded and feebly . *Scutellum* small, apex truncate. *Elytra* convex, more ice the length of head and prothorax combined, feebly larly increasing to near apex; middle, especially at sides, t rather distinctly punctate, very indistinctly punctate e; sides and suture feebly raised and thickened. *Legs* thin, posterior tibiæ feebly bent throughout. Length 1 mm.

-Tamworth, N.S.W.

legs and eleven-jointed antennæ this species appears to *Hypattalus*; it has, however, the appearance of a small *ius*, and in colour is very similar to *L. Eyrensis* and *L.*

DOMINALIS, Erichs. *Hab.*—Tasmania (Mr. A. Simson).

STRALIS, Fairm. *Hab.*—Sydney, Galstun, Como. I have s almost as large as the following species :—

EGANS, Blkb. *Hab.*—Hillgrove, Forest Reefs, N.S.W.

of *Carphurus* and *Helcogaster*, but with the proth
a chemist's mortar, with a strong transverse dep
base, and having eyes which, *when wet*, are of a l
green. There are at least four species belonging to
impunctatus, Lea; *Helcogaster tuberculatus*, Lea;
sented in my collection by a damaged specimen,
ing :—

NEOCARPHURUS CHLOROPS, n.sp.

♂. Narrow, elongate, shining. Head pale yell
green, when wet of a brilliant emerald green
yellow, three apical joints infuscate; prothorax t
elytra paler; abdomen black; legs testaceous, in
A few indistinct hairs at sides of apex of prot
sides of base of elytra; abdomen with a few scatt

Head transverse, largely and irregularly exc
three obscure tubercles triangularly arranged
Antennæ elongate, simple, 1st joint as long as tw
bined, 3rd-10th gradually increasing in length,
longer than 10th. *Prothorax* impunctate; lar
wide, base and apex truncate, apex almost conceali
head, greatly lessened to a very strong depressio
fourth narrow, strongly raised. *Scutellum* small
Elytra slightly longer than prothorax, impunctat
apex truncate, shoulders thickened. *Abdomen* alm
lessened to base and apex. *Legs* rather long a

in having the basal two-fifths of prothorax red; the depression on head larger and shining; antennæ shorter, the 3rd-10th joints serrate internally.

TENEBRIONIDÆ.

Arrhenoplita erecta, n.sp.

♂. Subparallel, shining; glabrous. Reddish-castaneous, head and prothorax dark reddish-brown, the latter with the margins paler.

Head scarcely punctate; on each side close to the eyes a short, stout, erect horn; each side of clypeus with a minute elevation; eyes coarsely faceted. *Prothorax* strongly transverse, finely punctate, sides margined. *Scutellum* transversely triangular. *Elytra* not thrice the length of prothorax, about once and one-half longer than wide; densely punctate. *Under surface* finely punctate. *Legs* thin. Length $2\frac{3}{5}$, width $1\frac{1}{4}$ mm.

♀. Differs in having a shorter head, a punctate impression in place of each of the horns, and a feebly punctate space behind the position of clypeal elevations in ♂.

Hab.—Sydney.

Each of the elytra, when viewed from above, appears to have about nine rows of large rounded dark punctures, but when viewed from the sides these are invisible in most (though not in all) of my specimens. The species differs from *A. pygmæa* in being larger, not uniformly coloured and brighter, horns of the head shorter, stouter and perfectly erect, less densely punctured and without the very fine pubescence of that species.

Adelium.

The synonymy in this genus and the group it belongs to I believe to be rather extensive, owing to the species being frequently variable in size and puncturation, and their (occasionally) strong sexual distinctions; but while distant from Sydney and the rich collections of the Macleay and Australian Museums and that of Mr. G. Masters, I shall not attempt to elucidate it, as

Bronzy-black, shining; head and prothorax less
elytra, under surface and legs black, knees feebly ti
antennæ blackish-brown with a feeble greenish refle

Head regularly, finely but not densely punctate; fi
sions straight, deep, at sides touching longitudina
vertex with two shallow impressions, usually lo
slightly oblique, sometimes transverse or circular
absent. Antennæ passing base of prothorax, 3rd
shorter than 4th-5th combined, 11th about once
longer than 10th and considerably wider. *Prothor*
as wide as long, finely and rather sparsely punctate
larger punctures or foveæ, but occasionally with
depressions; apex shallowly emarginate, base fee
sides regularly rounded both at apex and base, fin
with or without a feeble median line. *Elytra* a
than prothorax; striate-punctate, punctures regular,
not large; interstices regular, feebly convex, feebly
punctate; epipleuræ minutely and obsoletely punct
surface sparsely and minutely punctate. Length 7,

Hab.—Forest Reefs, N.S.W.

This species somewhat resembles *inconspicuum*, B
may be distinguished by its larger and more fine
prothorax, sparser and finer puncturation of head
interstices, and different colour; from *neophyta*, Pas
more distinct. I have numerous specimens.

Head rather sparsely punctate in front, densely, coarsely, and irregularly on vertex; frontal impression large and sinuous. Antennæ elongate, 3rd joint very long, almost the length of three following combined, 11th slightly wider and about once and one-third the length of 10th. *Prothorax* small, about once and one-third wider than long; apex shallowly but rather suddenly emarginate, base truncate, narrower than apex, greatest width slightly beyond middle, rather feebly decreasing to apex and suddenly incurved to base; densely, coarsely and irregularly punctate, much more coarsely in some specimens than in others. *Scutellum* triangular, finely punctate. *Elytra* at base wider, behind the middle much wider than prothorax; shoulders almost obsolete; striate-punctate, punctures subquadrate, separated by fine transverse ridges; interstices strongly convex, regular, finely and sparsely but distinctly punctate; epipleuræ densely and strongly punctate at base, more sparsely and obsoletely elsewhere. *Abdomen* finely and sparsely punctate and with distinct punctate impressions at sides, apical segment with small deep punctures. *Legs* rather long; anterior tibiæ moderately curved and somewhat swollen towards apex. Length 14; width of prothorax 4, of elytra 6 mm.

Hab.—Mt. Kosciusko (Mr. W. E. Raymond), Rhine Falls, N.S.W. (Mr. A. J. Coates).

A very distinct species, unlike any other known to me and leading off to *Apasis*. Mr. Pascoe says several of his species have such a trend, but judging by his descriptions *steropoides* and *ruptum* must be very distinct and probably belong to another section of the genus; *commodum* (which I know) certainly does.

ADELIUM MINUTUM, n.sp.

Black, highly polished; prothorax with a slight purplish lustre; under surface reddish-brown; legs, antennæ and palpi red. Prothorax with a long hair on each margin slightly behind the middle.

ed and rounded, and towards apex broken up into small circles, the junction of the transverse ridges marked by small vetures; epipleuræ moderately densely and strongly and almost gularly punctate. *Abdomen* minutely punctate, sides and apical gment rather strongly and deeply punctate. Four anterior ibiæ slightly curved. Length 15, width 7 mm.

Hab.—Wilcannia, N.S.W. (Mr. R. Helms).

A very distinct species, with puncturation of head unusually gular; it is not close to any species I am acquainted with.

A. PORCATUM, Fab. *Hab.*—N.S.W.; *var.* AUGURALE, Pasc. *Hab.*—Gayndah, Q.

A. TENEBRIOIDES, Erichs. *Hab.*—Tasmania.

A. STRIATUM, Pasc. *Hab.*—Brisbane, Tweed River; *var.* IRIDIPENNE, Macl.; (co-type).

A. PILOSUM, Pasc. *Hab.*—Wilcannia, N.S.W.

A. SCUTELLARE, Pasc. *Hab.*—Tamworth; Gayndah.

A. OBESUM, Pasc. *Hab.*—Tasmania.

A. COMMODUM, Pasc. *Hab.*—Tasmania.

A. CONGESTUM, Pasc. *Hab.*—Mt. Kosciusko, Rhine Falls, N.S.W.

A. REDUCTUM, Pasc. *Hab.*—Gayndah.

A. REPANDUM, Pasc. *Hab.*—Gayndah.

A. NEOPHYTA, Pasc. *Hab.*—Sydney, Mt. Kosciusko, Hillgrove, Tamworth, Forest Reefs.

A. SCYTALICUM, Pasc. *Hab.*—Rottnest Island, W.A.

A. VICARIUM, Pasc. *Hab.*—Swan River, Mt. Barker, Bridgetown, W.A.

A. GENIALE, Pasc. *Hab.*—Sydney, Galston, Blackheath, N.S.W.

A. LICINOIDES, Kirby. *Hab.*—Tasmania.

A. BREVICORNE, Bless. *Hab.*—Adelaide, Port Adelaide, S.A.

A. ABBREVIATUM, Boisd. *Hab.*—Tasmania.

not at all wider than apex; densely punctate, punctures similar those on head. *Scutellum* small, transverse, punctate or not. *Elytra* convex, scarcely wider than prothorax, parallel to near apex; punctate-striate, punctures large, subquadrate, separated by feeble transverse ridges, somewhat irregular; interstices strongly convex, punctate at sides and occasionally along middle towards apex, all of them cut up into narrow, conical, small and irregular tubercles; epipleuræ punctate throughout, punctures rather larger than those on prothorax. Sides and apical segment of *abdomen* with moderately dense, small and deep punctures. *Tibiæ* straight or almost straight. Length 14, width 6 mm.

Hab.—Geraldton, W.A.

From the description of *homogenea*, Pascoe, this species differs in the clypeal groove, but especially by the antennæ; of that species Mr. Pascoe says the last joint is oval and not larger nor longer than the 10th. In all my specimens the 11th joint is distinctly much the longest; there also appear to be differences in colour. *D. subpubescens*, Bates, is said to have the lateral margins of the prothorax not at all crenate, and is described as coming from New South Wales. My specimens range in size from 13 to 17 mm.

LICINOMA NITIDISSIMA, n.sp.

Black, very highly polished; antennæ, palpi, tarsi and knees red.

Head sparsely and scarcely visibly punctate, a strong, deep, straight impression in front. Antennæ moderately long, increasing to apex, 3rd joint distinctly shorter than 4th-5th combined, 11th considerably wider and about once and one-half the length of 10th. *Prothorax* about twice as wide as long, base and apex feebly incurved, finely and completely margined; with sparse and just discernible punctures, and with a moderately strong puncture on each side in front but rather distantly separated; sides rounded, slightly coarctate towards base. *Scutellum* small, transversely triangular. *Elytra* somewhat obliquely produced at base, sides slightly rounded; striate-punctate, striæ feeble; punctures rather small, subquadrate, not confluent, decreasing in size to margins and

and with three rows of oblong spaces impressed on each but not at their apices or bases; epipleuræ rather finely and letely punctate. *Under surface* (except sides of head) ely and obsoletely punctate. Four anterior *tibiæ* curved, kening to apex. Length 12, width 5 mm.

Hab.—Mt. Kosciusko, N.S.W. (Mr. W. E. Raymond).

Allied to *ocellata*, Pascoe, and *Mastersi*, Macleay; from the mer it appears to differ in some colour details. Mr. Pascoe scribes the prothorax with margins paler than disc; in my cimen the reverse is the case; nor does he mention any rger punctures on that segment; he also says "elytra with long impressed *rings*." The latter species is described as having rge punctures on the elytra.

C. DEPLANATA, Boisd. *Hab.*—Tasmania.

ECTYCHE SCULPTURATA, Bates.—I doubtfully refer numerous pecimens from Swan River to this species; they are variable as regards size and width, but none of them are of the size ascribed by Pascoe to *erebea*, with which in other respects they agree very well.

E. TUBERCULIPENNIS, Bates. *Hab.*—Geraldton, W.A.

E. CŒRULEA, Champ.; (co-type).

MICRECTYCHE FERRUGINEA, Bates.—An abundant species about the Swan River. I have also taken it at Newcastle, and at Rottnest and Garden Islands. It is common under logs and bark, and I have often seen it about the roots of dead grass, &c. The colour is somewhat variable; some specimens are almost wholly piceous.

MICRECTYCHE INTERMEDIA, Bates.—I refer specimens from Pelsart Island to this species; they are smaller and much darker than the generality of specimens of the preceding species.

propose to alter the name of my species to *tetraspi*

CURCULIONIDÆ.

Subfamily CLEONIDES.

LIXUS ALBOLINEATUS, n.sp.

Black, feebly shining, antennæ reddish, club dar with an ochreous dust, rather denser on under t surface. Rather densely clothed with whitish hai obscured by dust) on rostrum, legs, and under surfa with a distinct median line and the sides clothe interstices regularly clothed with white hair, but obscured by dust; three apical segments of abdomen their sides) with longer and denser hair than elsewl

Head and rostrum densely and regularly puncta with a small fovea between eyes *Prothorax* tra conical, base bisinuate; with a distinct and rather line; densely and coarsely punctate, intervening s punctate. *Elytra* about thrice the length of protho at base, shoulders rounded, sides feebly increasing t then decreasing to apex; striate-punctate, punctures oblong, separated by narrow ridges; interstices feeb alternate ones a little more distinctly so, a fe terminating the 4th-8th near apex. *Under surfac* finely punctate. Length 10, rostrum 2; width $3\frac{2}{3}$ m

Hab.—Richmond River, N.S.W.

Differs from *Mastersi*, Pascoe, in the much coar of prothorax, more distinct median line, more rou

LIXUS COPIOSUS, n.sp.

Black, somewhat shining; antennæ and legs (posterior femora excepted) dark red. Densely covered with white, yellow and ochreous dust irregularly distributed. Head, rostrum, legs and under surface densely clothed with short white pubescence, longer on metasternum and three apical segments of abdomen than elsewhere; prothorax with sides densely and the disc feebly clothed; elytra rather densely clothed, with a transverse, somewhat curved nude space on each side behind middle and not extending to suture, a smaller similar space on each side near apex.

Head and rostrum densely and finely punctate; a small deep fovea between eyes. Rostrum short, broad. *Prothorax* transverse, not much wider at base than at apex, sides feebly rounded and feebly biimpressed near apex, base bisinuate; with a feeble median carina; densely and moderately strongly punctate, intervening spaces densely punctate. *Elytra* wider than prothorax, shoulders rounded, subparallel to near apex, apex emarginate; seriate- (scarcely striate-) punctate, punctures moderately large, suboblong, rather distant; interstices almost flat, densely and finely punctate, feebly callous on each side near apex. *Under surface* densely and finely punctate. Length 8¾, rostrum 1¾; width 3⅓; variation in length 6-9½ mm.

Hab.—Behn River, E. Kimberley, W.A. (Mr. R. Helms).

Resembles *Mastersi*, Pascoe, but differently clothed, the legs differently coloured, and with decidedly stronger punctures on prothorax and elytra. The clothing and punctures have been described from washed specimens. Mr. Helms informs me that on an "old man salt-bush" *(Atriplex nummularis)** grown from seed, he could always obtain numerous specimens, but saw none elsewhere.

LIXUS MASTERSI, Pasc.—This species is exceedingly abundant in the coastal districts of New South Wales. In size it varie from 6½ to 10 mm. In some of my specimens the elytra a r

* This plant is not indigenous to North-Western Australia.

reddish-brown; in many there is a reddish tinge along the suture. The prothorax usually has either a feeble median line or a feeble carina, and is rarely without either. Mr. Olliff in the Agricultural Gazette of New South Wales, Vol. vi. (1895), in a plate facing p. 261, has given an excellent figure of this insect.

L. IMMUNDUS, Bohem. *Hab.*—Galston, N.S.W.

LIXUS TASMANICUS, Germ. (Linn. Ent. iii. 1848, p. 220).—Of this species (originally described from Adelaide) Mr. Pascoe says "I have specimens from Victoria, West Australia and Queensland." I have not been able to identify the species myself. It is omitted from the Catalogue.

Subfamily AMALACTIDES.

TRANES XANTHORRHŒÆ, n.sp.

♂. Of a flattened form; black, shining; legs and antennæ dark reddish-brown. Upper surface with very minute sparse whitish scales or setæ, more noticeable on elytra than elsewhere; under surface and legs with more distinct scales though still very small.

Head densely punctate, punctures small and shallow; a small distinct fovea between eyes. Eyes separated beneath by a narrow, impunctate, wedge-like space. Rostrum almost straight; densely punctate, punctures moderately large, confluent at sides, decreasing towards apex; slightly swollen at antennæ. Antennæ rather short; scape almost the length of funicle and club combined, inserted one-third from apex of rostrum, and one-third of its length

and considerably wider at base; sides straight and feebly increasing to near apex and then coarctate, apex moderately wide; seriate-punctate, punctures moderately large, subapproximate or not; interstices flat, becoming convex towards apex, rather densely punctate, in places with feeble transverse scratches. *Prosternum* between anterior coxæ (which are approximate) and apex with a highly polished space, impunctate except for some large punctures at its sides. *Metasternum* and two basal segments of *abdomen* rather sparsely punctate, two following segments more sparsely and minutely, apical segment moderately densely punctate. *Femora* stout, strongly dentate; four posterior tibiæ flattened, grooved, their outer apical third densely ciliate. Length (from apex of prothorax) $9\frac{1}{2}$, rostrum $2\frac{1}{6}$; width $3\frac{2}{3}$ mm.

♀. Differs in being larger, wider (especially the elytra), rostrum longer and thinner, glabrous space on prosternum less noticeable and wider, but especially by the femora being edentate.

Hab.—Darling Ranges, Mt. Barker, Bridgetown, Swan River, W.A.; Galston, Gosford, Sydney, N.S.W.

It appears to be a moderately common species at the bases of the leaves of various species of *Xanthorrhœa*.

Its flattened form will at once distinguish this species from all those with which I am acquainted. Of the others, *monopticus* appears to be truly remarkable, as of it Mr. Pascoe says:—"The eyes in this species are not only contiguous beneath, but there is no break in the continuity, the facets being freely interposed on both sides." *T. insularis*, Pascoe, must be very distinct. I can find no difference in my specimens except that those from New South Wales have the under surface with feebler puncturation and clothing than those from Western Australia

Tranes Vigorsi, Bohem.—This is an abundant species in Western Australia and may always be taken from the fruit of *Macrozamia*. I have specimens varying in length from 7 to 17 mm.

T. Roei, Bohem. *Hab.*—Mt. Barker, Swan River, W.A.

T. sparsus, Bohem. *Hab.*—Tamworth, Maitland, N.S.W.

T. INTERNATUS, Pasc. *Hab.*—Sydney.

Subfamily BELIDES.

BELUS ACACIÆ, n.sp.

Head blackish; rostrum, antennæ and prothorax piceous-brown; elytra of a rather dark brown; legs reddish; tarsi black. Head with whitish hair at sides of eyes; prothorax with a white median line; elytra rather sparsely clothed, the clothing denser and in small tufts towards suture. Under surface densely and almost regularly clothed, the hairs on prosternum tinged with yellow; a small round nude spot on each side of metasternum and of four basal segments of abdomen.

Head granulate, punctate. Rostrum comparatively short, feebly decreasing to apex, slightly curved; in ♂ densely and strongly punctate at base, sparsely but still distinctly towards apex, in ♀ sparsely but distinctly punctate throughout. Antennæ increasing in width to apex, in ♂ passing, in ♀ not reaching base of prothorax; 1st joint distinctly longer, 2nd slightly shorter than 3rd, 11th in both sexes twice the length of 10th. *Prothorax* as long as wide, regularly rounded in middle; more coarsely granulate than head; median line very feebly impressed. *Elytra* almost parallel to near apex, each feebly separately rounded, not produced, densely punctate; granulate at base and about suture; scarcely depressed about suture, which is slightly raised and thickened towards apex. Anterior *femora* each with a single distinct sharp tooth and several scarcely visible [illegible]

the others are much smaller; *serpens*, Pascoe, is described as "infra tenuiter ad latera densius albo-pilosus." The species much resembles *parallela*, Pascoe, but may be readily distinguished by the four basal segments of abdomen having only two nude spaces each. Numerous specimens were beaten from the dwarf *Acacias* about Geraldton, Walkaway and Dongarra.

BELUS GRANULATUS, n.sp.

♀. Reddish-brown, rostrum paler. Eyes scarcely margined with hair, prothorax without median but with distinct lateral lines of yellowish hair, elytra nude except for three or four small spots about the middle of suture. Under surface sparsely clothed, middle of abdomen almost nude.

Head densely granulate, slightly convex between eyes. Rostrum long, thin, shining, curved; densely punctate on basal half, very finely on apical. Antennæ long and thin, 1st joint considerably longer than 3rd and almost thrice the length of 2nd, 4th-10th feebly decreasing in length, 11th the length of two preceding combined. *Prothorax* transverse, subconical, strongly granulate, median line distinctly impressed. *Elytra* wider than prothorax, feebly incurved behind shoulders, apex strongly produced and narrow, not carinate or punctate; densely granulate; very feebly depressed on each side of suture. *Sterna* and basal segment of *abdomen* granulate. *Legs* long; femora feebly transversely corrugate, anterior bidentate, teeth small, four posterior unidentate, posterior just passing apex of 1st abdominal segment. Length 14½, beyond abdomen 1¾, rostrum 3⅔; width 3⅔ mm.

Hab.— Mt. Kosciusko, N.S.W. (Mr. W. E. Raymond).

Close to *bidentatus*, Donovan, but differs in the elytra being without lateral maculæ, impunctate, non-carinate and much less depressed along suture; prothorax with the granules smaller, more sharply defined, and the median line much less strongly impressed and devoid of hair; the head is differently clothed and more regularly granulate, and the whole insect is more opaque.

Bellus vertebralis n.sp.

♂ Head, rostrum and antennæ piceous-black, prothorax pale reddish-brown, elytra dark reddish-brown, legs red, tarsi darker. Head with sparse pale hairs, prothorax with a distinct median line continued on scutellum and elytral suture to apex. Under surface with a dense pale pubescence on each side, abdomen towards each side with a semicircular patch of pale hairs.

Head broadly granulate, granules larger between eyes than elsewhere. Rostrum long, slightly curved, punctate throughout, punctures denser and coarser at base. Antennæ moderately long, reaching to apex of 3rd joint considerably before that 3rd and 4th joints together the length of 2nd, 5th to 7th transverse, 11th slightly more than two preceding joints combined. *Prothorax* longer than wide, sides feebly rounded, apex scarcely narrower than base, rather strongly granulate, median line distinctly impressed. *Elytra* narrow, slightly wider than prothorax, feebly incurved behind shoulders, apex moderately produced, very densely and coarsely punctate, towards base subgranulate. *Sternum* granulate. Anterior *femora* obtuse, posterior not extending to apex of 1st abdominal segment. Length 11½, beyond abdomen 1½, rostrum 2, width 2 mm.

Hab. — Pinjarrah, W.A.

Remarkably close to *subvittis* Boisduval, but the obtuse femora will at once serve to distinguish it from that species; it is also considerably narrower, and with the sutural stripe when viewed under a lens appearing somewhat serrately disposed and not so beautifully regular.

Bellus rentus n.sp.

Head and prothorax piceous, elytra dark reddish-brown, apical half of rostrum of a rather pale red, antennæ brown becoming pale towards apex, legs red. Eyes distinctly margined in front with almost white hair, prothorax with yellowish hair forming a distinct median line and continued on to scutellum and along suture to apex of elytra, elytra elsewhere nude. Each side of

under surface from eye to apex of abdomen with a distinct stripe of yellowish hair, middle rather feebly clothed.

Head densely granulate. Rostrum comparatively short, noticeably curved, polished; basal half in ♂ densely and rather strongly punctate, apical half scarcely visibly punctate, in ♀ feebly punctured throughout. Antennæ in ♀ rather short, basal joint distinctly longer than 3rd, 2nd the length of 5th, 6th-10th slightly increasing in width and somewhat flattened, 11th twice the length of 10th.* *Prothorax* in ♂ as long as wide, in ♀ feebly transverse, apex narrowly subtubular, sides rounded, increasing to base, more noticeably so in ♀ than in ♂; densely granulate, each granule slightly irregular; median line distinctly impressed. *Elytra* very narrow, parallel-sided or very feebly decreasing to near apex, each feebly separately rounded and not produced at apex; feebly depressed along suture, suture itself feebly raised; densely, strongly and regularly punctate; not granulate. Femora edentate, posterior not extending to apex of 1st abdominal segment. Length 8, beyond abdomen $\frac{1}{5}$, rostrum $1\frac{1}{3}$; width $1\frac{1}{6}$ mm.

Hab.—Galston (Dumbrell and Lea), Gosford, N.S.W. (Lea).

Of the shape and size of *acicularis* and *parallelus*, Pascoe, but with clothing much as in *suturalis*, Boisduval. Compared with the latter species, *tenuis* differs in being much smaller and narrower, rostrum shorter, elytra not produced, &c.; from the two former species it is abundantly distinct by its clothing.

Belus rubicundus, n.sp.

Red; extreme apex of rostrum, 3rd tarsal joint and apex of 4th piceous; antennæ infuscate towards apex; head sometimes piceous. Sides of eyes and scutellum with white hairs, prothorax without white median line, elytra with a few scarcely visible hairs about suture and with three or four small and rather distant spots towards the apex, of which the apical one is rather elongate. Under surface regularly but not densely clothed with pale yellow hair, each of the four basal segments of abdomen with a rounded nude space on each side.

Head densely granulate, longer behind eyes than usual. Rostrum long, feebly curved, highly polished; moderately densely punctate at base, scarcely visibly so elsewhere. Antennæ elongate, 1st and 3rd joints subequal, 2nd short, 7th-11th considerably wider in ♂ than in ♀, 11th in ♂ about once and one-fourth longer than 10th, in ♀ about twice. *Prothorax* slightly longer than wide, apex subtubular, sides behind apex strongly rounded; median line rather strongly impressed at base. *Elytra* parallel-sided to near apex, very narrow; densely and strongly punctate, from some directions appearing granulate; slightly longitudinally depressed on each side of suture, suture itself feebly raised and densely and minutely punctate; each elytron feebly separately rounded, not produced. *Femora* edentate, posterior scarcely extending to apex of 1st abdominal segment. Length 8½, beyond abdomen ¼, rostrum 1¼; width 1½ mm.

Hab.—Swan River, W.A.

Allied to *acicularis*, Pascoe, but the clothing of the elytra and under surface will serve to distinguish it. My specimens range in size from 8 to 10 mm.

Belus longicornis, n.sp.

♂. Piceous-brown, legs paler except the apical tarsal joints, rostrum dark brownish-red. Eyes distinctly margined with pale hair, prothorax with a rather feeble median line, scutellum clothed, elytra nude except for a small longitudinal spot on sutu-

at apex and a small round spot just before it; under surface sparsely clothed, rather more feebly on middle of abdomen than elsewhere, no distinct nude spaces.

Head densely granulate. Rostrum densely punctate at base, beyond antennæ thinner and scarcely visibly punctate, highly polished and feebly curved. Antennæ long and slender, all the joints except 2nd much longer than wide, 1st the length of 3rd, 2nd about half its length, 3rd-10th subequal, 3rd-6th very thin, 11th about once and one-half the length of 10th. *Prothorax* slightly longer than wide, apex subtubular, basal three-fourths rounded; granules as on head; median line scarcely visible. *Elytra* very narrow, slightly decreasing beyond shoulders, each feebly separately rounded and not or scarcely produced at apex, not depressed along suture which is feebly raised near apex, densely and strongly punctate, scarcely granulate. *Femora* edentate, posterior not extending to apex of 1st abdominal segment. Length $6\frac{1}{2}$, beyond abdomen $\frac{1}{2}$, rostrum 1; width 1 mm.

Hab.—Sydney.

The smallest and narrowest species I am acquainted with. It is certainly not *linearis*, Pascoe, which is said to have "capite rostroque nigris . . . antennis . . . clava distincta 5-articulata . . . femoribus anticis bidentatis."

BELUS EDENTULUS, n.sp.

middle of rostrum, in ♀ slightly nearer the base, 1st joint longer than 3rd, 7th-10th increasing in width, 10th feebly transverse, 11th in ♂ long and cylindrical, feebly lessened towards apex and fully as long as three preceding joints combined, in ♀ shorter than three preceding joints combined but noticeably longer than two preceding, suddenly lessened to apex. *Prothorax* feebly transverse, much wider near base than at apex, median line feebly impressed towards apex, subfoveate towards base; densely and rather strongly granulate. *Elytra* long and narrow, behind base parallel to near apex, apex in ♂ moderately produced, in ♀ more distinctly; densely and strongly punctate; granulate towards base; convex and not at all depressed along suture. *Sternum* densely granulate; abdomen more strongly punctate than is usual in the genus. *Femora* edentate, posterior terminating before apex of 1st abdominal segment. Length 12, beyond abdomen 1, rostrum 2½; width 2 (vix) mm.

Hab.—Braidwood, N.S.W.

A narrow species allied to *filiformis*, Germar, from which, however, the puncturation of its elytra (which are more strongly produced at apex), its more strongly impressed median prothoracic line and very long terminal antennal joint will serve to distinguish it. The terminal joint is very long in *filiformis*, especially in the ♂, but it is much shorter than in the above species and very much shorter in ♀. I have a pair taken *in cop.* from an Acacia growing on top of a mountain near Braidwood.

Belus pudicus, n.sp.

♀. Piceous-brown, head darker, legs paler. Upper surface rather sparsely clothed with pale hair, prothorax with a feeble median line and traces of still feebler lateral lines, elytra very feebly maculate along suture. Under surface, especially the sides, rather densely clothed, each of the four basal segments of abdomen with a small round nude space on each side, the 3rd and 4th nude in middle, but the abdomen without a distinct longitudinal nude space.

Head densely granulate. Rostrum slightly longer than prothorax, slightly curved, basal fourth strongly punctate, elsewhere minutely or not at all punctate. Antennæ long, 1st joint distinctly longer than 3rd, 2nd much more than half the length of 3rd, 9th-10th transverse, their combined length equal to 11th. *Prothorax* transverse; densely granulate, granules rather small, base considerably wider than apex; median line distinctly impressed, especially at base. *Elytra* long and rather narrow, slightly convex, not depressed on each side of suture, almost imperceptibly incurved behind shoulders, apex scarcely produced, densely and strongly granulate-punctate throughout, the granules rather larger towards base than elsewhere. *Legs* moderately long, femora edentate, posterior just passing apex of 1st abdominal segment. Length 12, beyond abdomen ½, rostrum 2; width 2⅓ mm.

Hab.— Forest Reefs, N.S.W.

Allied to *filiformis*, Germar, but slightly wider and differently punctured; but from that species, and all its allies that I am acquainted with, it may be readily distinguished by its abdominal clothing and posterior femora.

B. BIMACULATUS, Pasc. *Hab.*—Queanbeyan, N.S.W.; Tasmania.

B. PLAGIATUS, Pasc. *Hab.*—Queensland.

B. PARALLELUS, Pasc. *Hab.*—Swan River, Pinjarrah, W.A.

B. ANGUINEUS, Pasc. *Hab.*—Geraldton, Pinjarrah, W.A.

B. BIDENTATUS, Donov. *Hab.*—N.S W.; W.A.

B. SUTURALIS, Boisd. *Hab.*—N.S.W.; W.A.

B. FILUM, Jekel. *Hab.*—Tamworth, Forest Reefs, Sydney.

B. PICA, Jekel. *Hab.*—Galston.

B. ACROBELES, Oll.; (co-type).

PACHYURA ALBICOLLIS, n.sp.

Black, antennæ black and dark red. Head densely clothed with short reddish-brown hair, with a small spot of white on vertex and on each side close to eyes; prothorax densely clothed with long whitish hair except for a nude space in middle and the extreme apex where the clothing is similar to that on head; scutellum with white hair; elytra with short hair of varying shades of yellow and brown, a few small whitish spots forming a transverse series near apex and a moderately distinct dark velvety fascia across middle. Metasternum densely clothed with white, abdomen with ochreous-red and rather sparse hair.

Head large, transverse, with numerous granules showing through clothing. Rostrum long, almost straight, round; opaque; densely punctate, punctures coarser towards base. Antennæ moderately long, 1st joint slightly longer than 3rd, 5th-6th slightly longer than wide, 7th-10th transverse, 11th as long as two preceding combined. *Prothorax* transverse, convex, apex narrowed, sides rounded, median line distinctly impressed; densely granulate, granules usually concealed. *Elytra* convex, feebly increasing in width to near apex, then strongly conjointly rounded, at base slightly wider than prothorax; moderately densely (but somewhat irregularly) covered with small shining granules, suture towards apex with small granules. *Legs* with flattened granules; femora thick, the anterior each with six teeth of which two are subapical and very distinct, and four much smaller ones are longitudinally placed behind the outer one; four posterior femora unidentate; anterior tibiæ slightly curved. Length 11¼, rostrum 2⅔; width 4 mm.

Hab.—Tamworth, Inverell, N.S.W.

A specimen under examination differs in having the clothing of the head uniformly reddish-brown and the clothing of metasternum reddish-ochreous. A very distinct species on account of its prothoracic clothing. It is allied to *cinerea*, Blanchard, but the elytra are much less strongly rounded towards apex and are more convex. I have seen several other specimens in the late Mr. A. S. Olliff's collection which were taken by Mr. J. H. Rose either at Inverell or Walgett.

P. AUSTRALIS, Hope. *Hab.*—N.S.W.; W.A.

P. CINEREA, Blanch. *Hab.*—Tasmania; Mt. Kosciusko, N.S.W.

P. CONGESTA, Pasc. *Hab.*—Wide Bay, Q.

RHINOTIA HŒMOPTERA, Kirby. *Hab.*—N.S.W.

R. CRUENTA, Pasc. *Hab.*—Geraldton, W.A.

R. SPINIPENNIS, Lac. This is a manuscript name only.

LEBUS, n.g.

Head moderately large. *Eyes* round, prominent. *Rostrum* short, broad. *Antennæ* slender, basal joint moderately thick, 2nd short. *Prothorax* subconical. *Scutellum* distinct, apex rounded, almost perpendicular. *Elytra* much wider than and strongly raised above prothorax, apex produced. *Legs* rather long; femora thickened, unidentate, posterior almost extending to

in places sparsely clothed with ochreous and brown pubescence of various shades, a distinct pale oblique stripe on each side terminating just before middle, suture white near apex, several small fascicles at summit of posterior declivity and several still feebler below it. Under surface with rather sparse long ochreous pubescence, white on prosternum, two distinct and moderately well-defined white stripes on abdomen; legs with ochreous pubescence, tibiæ feebly ringed.

Head granulate, granules almost concealed, two strong longitudinal slightly interrupted ridges between eyes. Rostrum the length of prothorax; basal two-thirds strongly granulate; apical third glabrous; finely punctate; apex slightly dilated. Antennæ slender, 1st joint noticeably shorter than 3rd. *Prothorax* transverse, subconical, largely excavated along the middle, a distinct ridge on each side behind the ridges on head, becoming subobsolete towards base, excavated outside the ridges and more feebly so at the sides, sides and base rather sparingly granulate. *Elytra* almost twice the width of prothorax, strongly and almost perpendicularly raised at base, basal four-fifths parallel, then oblique, narrowed to apex, apex produced and bifurcate; granulate at base and punctate elsewhere, but granules and punctures almost concealed; depressed along suture, then ridged, the ridge distinct on basal third, more rounded posteriorly, the ridges terminating in small fasciculate tubercles. Femora thick, slightly granulate. Length 14, beyond abdomen 1¼, rostrum 2; width 4⅜.

Hab.—Victoria.

I am indebted to Mr. W. Kershaw, Senr., for two specimens of this fine insect.

Subfamily CYLADES.

MYRMACICELUS PUERULUS, n.sp.

Black, glabrous, shining.

Rostrum slightly curved, finely punctate. *Prothorax* compressed, narrow; depressed and finely punctate at base. *Elytra* finely punctate, smooth, and without lateral striæ. *Under surface*

[illegible] interstices not much wider than punctures and fe
Under surface moderately strongly punctate. L
♀ 2 mm.

Hab.—Tamworth, N.S.W.

A rather robust species.

APION AEMULUM, n.sp.

Black; rostrum dark red, its base piceous; legs testaceous; tarsi infuscate. Rather densely clothed pubescence, a little less regular on elytra than elsew

Size and sculpture much as in preceding, but almost straight, the prothoracic fovea much less punctures in elytral striæ only moderately str interstices proportionately wider and more dens Length 2 mm.

Hab. Tamworth.

Very close to the preceding, but the straight rost r from being regarded as a variety only of the for both sexes.

APION PHILANTHUM, n.sp.

Body usually of a dark piceous-brown or black dark red, rostrum black, piceous, or red, usually dar in ♀, legs pale reddish-testaceous, tarsi infuscate; usually concolorous with upper, but the abdomen son Densely clothed with whitish pubescence, often slig in middle of elytra; under surface with purer pul

punctate; punctures concealed. *Elytra* strongly striate-punctate, but sculpture partially concealed. *Under surface* densely punctate. Length ♂ 2½, ♀ 2 mm.

Hab.—Behn River, Wyndham, W.A. (Mr. R. Helms).

A densely pubescent species, somewhat variable in size and colour, the eyes are larger and more coarsely faceted than is usual.

APION BINOTATUM, n.sp.

Pale brownish-testaceous; antennæ darker; legs paler; elytra paler than prothorax but as dark at about the basal third, and just before the summit of posterior declivity, each with a rounded dark brown spot. Moderately densely clothed with yellowish (on the under surface whitish) pubescence, more condensed on the elytral interstices about suture than elsewhere.

Head densely punctate. Rostrum the length of prothorax, moderately stout, distinctly curved, feebly decreasing to apex; strongly punctate. Antennæ inserted at about the basal third of rostrum. *Prothorax* moderately transverse, sides rounded, base scarcely wider than apex; strongly punctate; a small fovea in middle of base. *Elytra* strongly striate-punctate; punctures large, subоblong; interstices moderately wide, the 4th narrower than the 3rd or 5th. Length 2 mm.

Hab.—Swan River, W.A.

The two spots on the elytra (if constant) should render this species very distinct; it is rather narrower than is usual.

APION CONGRUUM, n.sp.

♂ (?). Reddish-testaceous, legs paler. Moderately clothed (sparse beneath) with yellowish pubescence.

Head moderately punctate. Rostrum about once and one-half the length of head and prothorax combined, more strongly punctate and thicker at base than towards apex, feebly curved throughout. Antennæ inserted at about the basal third of rostrum. *Prothorax* transverse, sides increasing to near base; densely punctate; with a small distinct fovea near middle of base. *Elytra* punctate-

sides coarctate towards apex. *Under surface* densely punctate, but punctures almost concealed. Length 2⅓ mm.

Hab.—Bunbury, W.A.

A comparatively elongate species with legs of a peculiar red colour.

APION FUSCOSUTURALE, n.sp.

Red, head sometimes darker, legs paler; tarsi and elytral suture infuscate. Moderately clothed with yellowish pubescence, more irregular on elytra (where it is frequently condensed about scutellum and summit of posterior declivity) than elsewhere; clothing whitish beneath.

Head moderately punctate. Rostrum in ♂ as long as head and prothorax combined, in ♀ slightly shorter; distinctly curved, basal third enlarged and strongly punctate. Antennæ inserted at basal third of rostrum. *Prothorax* feebly transverse, sides enlarging to near base; densely punctate; with a moderately distinct basal fovea. *Elytra* wide, striate-punctate; punctures large on disc, small at sides; interstices convex and the width of punctures on disc, flat and very much wider than punctures at sides. *Under surface* rather feebly punctate. Length ♂ 2⅓, ♀ 2 mm.

Hab.—Swan River.

A small robust species.

APION INTEGRICOLLE, n sp.

Red; under surface (except apical segments of abdomen) black or piceous, elytral suture and claw-joints infuscate, legs and rostrum pale testaceous. Moderately densely clothed with yellowish pubescence, clothing of under surface almost white.

Rostrum in ♂ the length of head and prothorax combined, in ♀ the length of prothorax only; slightly curved, feebly diminishing to apex. Antennæ inserted at about basal third of rostrum, 1st joint as long as 2nd-5th combined. *Prothorax* transverse, base bisinuate, sides enlarging to near base. *Elytra* punctate-striate; interstices convex, the width of or wider than punctures. Length ♂ 2⅔, ♀ 2⅓ mm.

Hab.—Albany, W.A.

The rostrum of the ♂ is fully once and one-half that of the ♀.

APION CARPOPHAGUM, n.sp.

Reddish- or piceous-brown, occasionally dark red; under surface piceous or piceous-black; legs testaceous, claw-joint infuscate. Densely and nearly always regularly clothed with greyish pubescence; sterna with paler clothing.

Rostrum in ♂ almost the length of head and prothorax combined, in ♀ shorter and stouter; slightly curved, very feebly diminishing to apex. Antennæ as in preceding. *Prothorax* scarcely transverse, sides enlarging almost to base, punctures almost concealed. *Elytra* rather feebly punctate-striate; interstices convex, densely and finely punctate. Length ♂ $2\frac{1}{2}$, ♀ $2\frac{1}{2}$ mm.

Hab.—Rottnest Island, W.A.

Much darker than the preceding or any of the following species.

APION IMMUNDUM, n.sp.

Pale reddish-testaceous, legs paler. Clothing yellowish on upper, whitish on under surface.

Rostrum of ♂ almost the length of elytra and considerably longer than head and prothorax combined, of ♀ slightly longer than prothorax; comparatively thin, feebly curved, scarcely

Rostrum slightly longer than prothorax and scarcely longer in ♂ than in ♀; moderately strongly curved, shorter than usual and feebly decreasing to apex, distinctly punctate throughout. Antennæ as in *integricolle* except that they are somewhat stouter. *Prothorax* distinctly transverse, sides increasing to near base, base more depressed than is usual. *Elytra* striate-punctate; interstices convex, as wide as or wider than punctures and finely punctate. Length (♂♀) 2¼ mm.

Hab.—Sydney.

Of this species I have seen many thousands of specimens on a species of *Solanum* (on the buds and young flowers of which they live) growing about Sydney. The species may be distinguished from *carpophagum* and *integricolle* by its comparatively short rostrum (scarcely variable sexually).

APION ANTHIDIUM, n.sp.

Red; sterna unusually dark, rostrum (except muzzle and base) and legs testaceous, claw-joint infuscate. Upper surface moderately densely clothed with yellowish pubescence, usually condensed on each side of scutellum, the elytra usually with a distinct nude spot on each side of middle, the spots often connected and the pubescence absent on suture towards base; sterna more densely, abdomen less densely clothed than prothorax.

Rostrum of ♀ the length of prothorax, of ♂ slightly longer; stout, distinctly curved. *Prothorax* as in preceding, except that it is less depressed at base. *Elytra* striate-punctate; interstices convex; on disc narrower than punctures, on sides wider. Length ♂ 2⅜, ♀ 2½ mm.

Hab.—Swan River.

A comparatively robust species.

APION TERRÆ-REGINÆ, Blkb.—I have a specimen (labelled "Brisbane, Tryon,") which I cannot satisfy myself is distinct from this species. It differs from the description in being smaller (4⅛ mm.) and but feebly shining; the head (described by Mr. Blackburn as "inter oculos concavo") has two distinct channels

between the eyes. Compared with *argutulum*, Pascoe, it in being much larger, rostrum more strongly curved, elytr stices (although flat) less regular and the legs compa shorter.

APION ALBERTISI, Pasc.—I have a specimen from the Ri River which agrees very well with Mr. Pascoe's descri this species, except that it is smaller (3 mm.). At first appears to belong to *Myrmacicelus* rather than to *Apion*.

APION COMOSUM, Pasc.—I have specimens of this spec Bunbury, W.A., and other species both from E. and W. A which strongly resemble it, and which induce me to thi Mr. Pascoe was probably mistaken in referring Que specimens to *comosum*.

A. PULICARE, Pasc. *Hab.*—Garden Island, W.A.

A. ARGUTULUM, Pasc. *Hab.*—Sydney, Dalmorton, N.S

The following is a Table of the Species :—

Body and legs black.
- Elytral striæ (except sutural) very feeble..... *Albertisi*, Pa
- Elytral striæ regular and distinct.
  - Head with two grooves between eyes.
    - Upper surface pubescent (or setose)..... *terræ-reginæ*,
    - Upper surface glabrous..... *argutulum*, P
  - Head not or very feebly grooved between eyes.

Rostrum short. ..... *foveicolle*, n.sp.
Rostrum longer.
Rostrum almost straight..... *teretirostre*, n.sp.
Rostrum distinctly curved..... *fuscosuturale*, n.sp.
Prothorax with or without a feeble longitudinal impression at base.*
Rostrum much longer in ♂ than in ♀.
Sterna black or blackish.
Rostrum (at least of ♀) concolorous with legs .... *integricolle*, n.sp.
Rostrum considerably darker than legs ..... *carpophagum*, n.sp.
Sterna red.
Rostrum of ♂ almost the length of elytra... *immundum*, n.sp.
Rostrum of ♂ much shorter than elytra..... *pulicare*, Pasc.
Rostrum scarcely or not at all longer in ♂ than in ♀.
Rostrum the length of head and prothorax combined..... *comosum*, Pasc.
Rostrum the length of, or very little longer than prothorax.
Prothorax depressed at base .... *solani*, n.sp. ♀
Prothorax scarcely depressed at base..... *anthidium*, n.sp.

Subfamily ATTELABIDES.

EUOPS.

I believe the most *reliable* specific character of the species of this genus consists in the puncturation, especially of the prothorax. The species known to me may be thus tabulated :—

Eyes contiguous..... .... *falcata*, Guér.
Eyes subcontiguous.
Prothorax transversely punctate or corrugate.
Elytra golden or greenish-golden..... *Bakewelli*, Jekel.
Elytra black .... *corrugata*, n.sp.
Prothorax scarcely visibly punctate..... *strigiventris*, n.sp.

* The characters given for the species which here follow are anything but satisfactory, but there appear to be none better; they all (as well as others which are represented in my collection by unique or but very few specimens and therefore not described) appear to be distinct; it is possible that some of them should be regarded as varieties only. I have thought it best, however, to regard them all as species.

Elytral interstices convex, punctures subequal at base and apex.

Elytra bronzy, prothorax greenish..... *pun*

Elytra not bronzy, almost concolorous with prothorax..... *euca*

EUCOPS FALCATA, Guér.—This is a very varia regards colour, form and size. The markings of vary from green to blue, are sometimes absent at b at apex, and even entirely absent; the scutellum green, the elytra frequently have a bluish or green abdomen varies from a rather pale red to a deep bl a large ♀ specimen I possess the entire head is b rostrum pale red before and dark red behind the a size varies from 3½ to 7 mm. I have specimens Sydney, Hillgrove, Loftus, Queanbeyan, Armidale, J Forest Reefs and Mount Kosciusko; though widely is not an abundant species. *E. australasiæ*, Fahræu been referred to this species, and I believe that *E* and *puncticollis*, Boheman, should also be referred t

EUCOPS BAKEWELLI, Jekel.—I have seven specimens and Gosford) which probably belong to this species, from M. Jekel's description in being smaller (rangi 2½ mm.), and by having the elytral interstices sc punctate. In one specimen the prothorax is stron on each side, in three others slightly impressed, and entirely without lateral impression. The

entirely with Mr. Pascoe's description and he received his specimens from Mr. Masters, might almost be regarded as co-types. They measure 4 mm.; two specimens from Sydney and Tamworth are much smaller (2½ mm.), but I cannot find any other difference between them. Mr. Pascoe omitted to give the length in his description.

EUOPS VICTORIENSIS, Blackb.—This species can be readily distinguished by its elytral puncturation. I have specimens from Clifton, N.S.W.; the male has the anterior tibiæ much as in *E. falcata*.

EUOPS SUTURALIS, n.sp.

♀. Head greenish-black, apex of rostrum suffused with red; prothorax red, base and apex narrowly infuscate; elytra of a rather paler red than prothorax; scutellum, a subquadrate patch about it and the suture black, apex slightly infuscate; mesosternum and pygidium violet-black; metasternum and abdomen metallic-green; legs green, base of femora, two basal joints of tarsi and the tibiæ more or less red.

Head densely and strongly punctate, at base finely transversely corrugate. Rostrum short, broad, finely punctate. Eyes separated by a thin shining carina. *Prothorax* transverse, sides rounded, apex slightly narrower than base, a strong transverse impression at base, a moderately strong one across disc, and a feeble one at apex; moderately strongly and not very densely punctate. *Scutellum* small, subquadrate, impunctate, highly polished. *Elytra* not much longer than wide, shoulders prominent, rather suddenly narrowed behind them; striate-punctate, punctures rather strong and subcontiguous, with a short distinct scutellar stria; interstices wider than punctures, convex, scarcely visibly punctate. *Sterna* and *pygidium* densely and strongly, *abdomen* finely punctate. *Legs* rather short; anterior tibiæ sinuous, no longer than femora. Length 2½, width 1⅓ mm.

Hab.—Dalmorton, N.S.W.

Differs from the ♀ of *falcata* in its subcontiguous eyes, short robust form, more convex elytra, finer puncturation, &c.; in build

strongly punctate. *Prothorax* transverse; densely and strongly punctate; sides increasing to near base, a small fovea near base. *Elytra* strongly striate-punctate, punctures large, subobl[ong] interstices not much wider than punctures and feebly punctate. *Under surface* moderately strongly punctate. Length ♂ 2½ ♀ 2 mm.

Hab.—Tamworth, N.S.W.

A rather robust species.

APION ÆMULUM, n.sp.

Black; rostrum dark red, its base piceous; legs pale reddish testaceous; tarsi infuscate. Rather densely clothed with whit pubescence, a little less regular on elytra than elsewhere.

Size and sculpture much as in preceding, but the rostrum almost straight, the prothoracic fovea much less distinct, th punctures in elytral striæ only moderately strong, and th interstices proportionately wider and more densely punctate Length 2 mm.

Hab.—Tamworth.

Very close to the preceding, but the straight rostrum prevent it from being regarded as a variety only of the former. I hav both sexes.

APION PHILANTHUM, n.sp.

Body usually of a dark piceous-brown or black, [illegible]

punctate, punctures concealed. *Elytra* strongly striate-punctate, but sculpture partially concealed. *Under surface* densely punctate. Length ♂ 2½, ♀ 2 mm.

Hab.—Behn River, Wyndham, W.A. (Mr. R. Helms).

A densely pubescent species, somewhat variable in size and colour; the eyes are larger and more coarsely faceted than is usual.

APION BINOTATUM, n.sp.

Pale brownish-testaceous; antennæ darker; legs paler; elytra paler than prothorax but as dark at about the basal third, and just before the summit of posterior declivity, each with a rounded dark brown spot. Moderately densely clothed with yellowish (on the under surface whitish) pubescence, more condensed on the elytral interstices about suture than elsewhere.

Head densely punctate. Rostrum the length of prothorax, moderately stout, distinctly curved, feebly decreasing to apex; strongly punctate. Antennæ inserted at about the basal third of rostrum. *Prothorax* moderately transverse, sides rounded, base scarcely wider than apex; strongly punctate; a small fovea in middle of base. *Elytra* strongly striate-punctate; punctures large, suboblong; interstices moderately wide, the 4th narrower than the 3rd or 5th. Length 2 mm.

Hab.—Swan River, W.A.

The two spots on the elytra (if constant) should render this species very distinct; it is rather narrower than is usual.

APION CONGRUUM, n.sp.

♂ (?). Reddish-testaceous, legs paler. Moderately clothed (sparse beneath) with yellowish pubescence.

Head moderately punctate. Rostrum about once and one-half the length of head and prothorax combined, more strongly punctate and thicker at base than towards apex, feebly curved throughout Antennæ inserted at about the basal third of rostrum. *Prothorax* transverse, sides increasing to near base; densely punctate; with a small distinct fovea near middle of base. *Elytra* punctate-

readily distinguished by its non-corrugate proth
eucalypti, to which it is more closely allied, it may b
by its different colour, much more coarsely punctu
and more convex form.

Subfamily RHINOMACERIDES.

AULETES.

Of this genus but six Australian species have l
possibly on account of the small size of the insec
but more probably owing to the excessive rarity
thus, out of fourteen species in my collection, ei
sented by unique specimens, and of only three
more than two individuals. Of the described
identify but two, and doubtfully a third. The sex
(apart from the eyes, which are much larger in th
the female) appear to be slight.

AULETES BREVIROSTRIS, n.sp.

♂. Head and rostrum black, antennæ black, th
joints dark brown; prothorax piceous with a copp
and apex narrowly margined with testaceous; el
beneath piceous-brown; legs testaceous, apex of fem
joints of tarsi infuscate. Sparsely clothed with
pubescence.

Head densely and strongly punctate; eyes lar
short, the length of prothorax or the decapitated
increasing in width to apex, densely and stro

The rostrum in this species is much shorter than in any of its known Australian congeners.

AULETES MINOR, n.sp.

♀. Piceous; very sparsely clothed with short greyish pubescence; head glabrous.

Head rather feebly punctate; eyes small. Rostrum, long, thin, subcylindrical. Antennæ inserted at extreme base of rostrum, 2nd joint thicker than 1st. *Prothorax* with sides increasing to near base; densely and moderately strongly punctate. *Elytra* moderately densely but (except near base) rather shallowly punctate; sutural stria very distinct. Length 1⅔, rostrum ⅔ mm.

Hab.—Dalmorton, N.S.W. (on *Ficus* sp.).

The smallest species of the genus hitherto described from Australia.

AULETES EUCALYPTI, n.sp.

Clear reddish-testaceous; rostrum either entirely piceous or piceous at the base only; club and suture of elytra infuscate; body beneath (except prosternum) black; legs reddish, apical joints of tarsi infuscate. Sparsely clothed with short greyish pubescence; head glabrous.

Head sparsely and finely punctate; eyes large in ♂, small in ♀. Rostrum about once and one-half the length of prothorax, shining and feebly increasing to apex. Antennæ inserted at extreme base of rostrum, 2nd joint as thick as but shorter than 1st. *Prothorax* transverse, sides increasing to near base, then suddenly lessened; strongly but not very densely punctate. *Elytra* not very densely and rather feebly punctate, punctures moderately strong at base; sutural stria very distinct, narrower in ♀ than in ♂. Length 1⅔, rostrum ⅔ mm.

Hab.—Swan River, W.A. (on young Eucalypts).

In appearance resembling the species I suppose to be *suturalis*, Waterhouse, but smaller and the insertion of antennæ different.

prothorax either reddish-testaceous or brown, witl
apex paler; scutellum black or brown; elytra stran
taceous, usually triangularly tinged with a darker
scutellum and sometimes with the suture infus
surface black, dark brown, or testaceous-red; legs p
apical joints of tarsi black or dark brown. Mode
clothed with greyish pubescence, usually denser
elsewhere.

Head densely and rather strongly punctate; eye
in ♂ than in ♀. Rostrum very long, slightly
punctate at sides. Antennæ more slender than is
at extreme base of rostrum, 2nd joint noticeabl
thinner than 1st. *Prothorax* in ♀ as long as wi
verse; sides increasing to near base and then sudc
very densely and moderately strongly punctate,
without a very feeble median line. *Elytra* wider
than is usual; feebly punctate; sutural stria very fe
$1\frac{2}{3}$, rostrum $\frac{3}{4}$ mm.

Hab.—Geraldton (abundant on a dwarf species
Rottnest Island, W.A.

This species can scarcely be *filirostris*, Pascoe, a
ing in a number of details, especially in the lon
have numerous specimens, the longest of which sca
1 line (Pascoe describes *filirostris* as $1\frac{1}{2}$ lines in l
majority are much smaller; the colour also appears

Head densely and moderately strongly punctate; eyes small. Rostrum long, subcylindrical, feebly increasing to apex; punctate at sides. Antennæ inserted near base of rostrum, rather shorter than usual, 2nd joint noticeably larger and longer than 1st. *Prothorax* slightly longer than wide, sides feebly increasing to near base, densely and moderately strongly punctate. *Elytra* densely, strongly and almost equally punctate throughout, punctures larger than on prothorax; sutural stria scarcely traceable. Length 2, rostrum $\frac{3}{4}$ mm.

Hab.—Forest Reefs, N.S.W.

A very distinct species.

AULETES INSIGNIS, n.sp.

♀ (?). Head, prothorax and legs (apical joints of tarsi excepted) of a clear bright red; rostrum dark reddish-brown, antennæ pale red, club infuscate; scutellum and elytra brownish-purple; under surface (prosternum excepted) black. Sparsely clothed with short greyish pubescence, more noticeable on elytra than elsewhere.

Head scarcely visibly punctate; eyes comparatively small. Rostrum long, shining, subcylindrical, feebly increasing to near apex; sides feebly punctate. Antennæ inserted at about one-fourth from base of rostrum, 2nd joint slightly shorter and thicker than 1st. *Prothorax* somewhat flattened, base considerably narrower than apex; moderately strongly but not very densely punctate. *Elytra* rather elongate, densely punctate, punctures moderately strong at base but feeble elsewhere; sutural stria distinct. Length $2\frac{1}{3}$, rostrum $\frac{2}{3}$ mm.

Hab.—Sydney.

A distinct and handsome species.

AULETES PALLIPES, n.sp.

♂ (?). Reddish-testaceous, elytra testaceous, scutellum black, legs (including all the tarsi) pale testaceous. Sparsely clothed with very short greyish pubescence.

AULETES DENSUS, n.sp.

Of a very dark reddish- or purplish-brown, head and rostrum darker; legs reddish-testaceous, four posterior femora more or less tinged with brown, apical joints of tarsi blackish. Not very sparsely clothed with very short greyish pubescence, longer at sides of elytra than elsewhere.

Very densely and strongly punctate, the punctures rather larger on elytra than on head and prothorax. *Eyes* considerably larger in ♂ than in ♀. Rostrum about once and one-third the length of prothorax in ♂, slightly longer in ♀; noticeably increasing to apex. Antennæ inserted at about one-fourth from base of rostrum, two basal joints almost equal. *Prothorax* in ♀ scarcely, in ♂ slightly but noticeably transverse, sides very feebly increasing to beyond the middle. *Elytra* with sutural stria moderately distinct. *Abdomen* feebly transversely wrinkled. Length $2\frac{2}{3}$, rostrum $\frac{4}{5}$ mm.

Hab.—Forest Reefs.

Allied to *calceatus*, from which it may be distinguished by its shorter rostrum, somewhat narrower and more uniformly punctured elytra, and by its much darker colour. It appears also to be allied to *nigritarsis*, Pascoe, but differs from the description of that species in the rostrum, width of prothorax, puncturation of elytra, &c.

AULETES CALCEATUS, Pasc.—Individuals of this species vary from 2 to $4\frac{1}{2}$ mm. (including the rostrum). Mr. Pascoe describes the rostrum as paler at apex than at base; in several of my specimens this is the case, in the others it is uniformly shining black. There is usually a circular fringe of white hairs about the scutellum, which is usually more distinct posteriorly. The species occurs on Eucalypts; and I have it from Swan River, Bunbury, and Albany.

AULETES TURBIDUS, Pasc.—I have taken a specimen of this species at Mount Lofty, S.A., on a young Eucalypt.

AULETES (METOPON) SUTURALIS, Waterh.—I have a number of species which agree very well with the brief description of this species, but one which agrees so well with the description and figure as well as the diagnosis of *Metopon* that I shall regard it as *suturalis* till evidence is forthcoming to the contrary. I have two specimens (from Tamworth and Sydney).

Following is a Table of the Species :—

Rostrum the length of prothorax.....	*brevirostris*, n.sp.
Rostrum considerably longer than prothorax.	
Antennæ inserted at extreme base of rostrum.	
Colour entirely dark.....	*minor*, n.sp.
Head glabrous.....	*eucalypti*, n.sp.
Head feebly or moderately pubescent.	
Rostrum straight	*turbidus*, Pasc.
Rostrum slightly curved and much longer...	*melaleucæ*, n.sp.
Antennæ not inserted at extreme base.	
Sutural stria very feeble and indistinct.....	*pilosus*, n.sp.
Sutural stria distinct.	
Elytra of a different and much darker colour than prothorax.....	*insignis*, n.sp.
Elytra concolorous with or paler (suture excepted or not) than prothorax.	
Tarsi with 3rd joint concolorous with tibiæ.	*pallipes*, n.sp.
Tarsi with 3rd joint much darker than tibiæ.	
Head sparsely punctate.....	*suturalis*, Waterh.(?)
Head densely punctate.	
Elytra (except at base) almost obsoletely	

to the derm on which it rests, and in addition with pale yellow or white spots, two at base on suture appearing as a single bilobed spot, 2nd and 3rd interstices each with a spot about two-fifths from apex, the 3rd with a spot at apex, a spot at base of 4th and one in middle of 5th. Pygidium feebly, under surface densely clothed.

Eyes large, convex, moderately separated. Rostrum short, stout, slightly curved; strongly punctate in ♂, less noticeably in ♀. Scape inserted nearer apex than base of rostrum, as long as club and shorter than funicle; 1st joint of funicle larger but scarcely longer than 2nd. *Prothorax* compressed and subtubular at apex; median line feebly impressed; a distinct subfoveate impression on each side of base. *Scutellum* transverse, within a depression. *Elytra* longer than wide; interstices wide, flat, the 2nd to 6th granulate near apex. *Pygidium* non-carinate. *Legs* rather short; femora (especially the anterior) strongly dentate; claw-joint very distinct. Length 4, rostrum 1 (vix); width 2 mm.

Hab.—Cairns, N.Q. (Mr. G. Masters).

A very pretty and distinct species.

LÆMOSACCUS RIVULARIS, n.sp.

Head (except at sides), rostrum, anterior legs (knees and tarsi excepted), sterna and abdomen piceous-black; prothorax dull red at sides and apex, piceous in middle; elytra paler than prothorax; sides behind shoulders tinged with piceous; legs reddish. Head with yellowish pubescence between eyes; prothorax with a median line of yellowish pubescence, less condensed in middle, and from base continued on to scutellum, a small feeble spot on each side of middle, a spot on each side at apex and a large spot laterally at base and apex; elytra clothed much as in the preceding except that the spots are more numerous and less distinct; clothing of under surface yellow and rather dense.

Eyes large, feebly convex, moderately separated. Rostrum moderately long, subcylindrical, curved and feebly punctate. Scape inserted nearer apex than base of rostrum, curved at apex, as long as club and shorter than funicle, 1st joint of the latter

distinctly longer than 2nd. The rest as in preceding. Length 5, rostrum $1\frac{1}{4}$; width $2\frac{1}{8}$ mm.

Hab.—Richmond River.

Allied to the preceding, of which it is perhaps only a strongly marked variety.

LÆMOSACCUS FRATER, n.sp.

Dark piceous-brown, scape and basal joints of funicle dull red. Prothorax feebly clothed; elytra with a large basal patch of whitish pubescence narrowly continued along suture to apical third, a few spots at apical third representing a feeble transverse fascia.

Eyes depressed and distant. Rostrum long, rather strongly curved, dilated towards apex, basal two-thirds subcylindrical; densely and strongly punctured. Antennæ short. Scape inserted slightly nearer base than apex of rostrum, longer than club but much shorter than funicle; 1st joint of the latter obtriangular, slightly shorter than 2nd. *Prothorax* subtubular at apex, scarcely depressed along median line, with a strong impression on each side at base and a feebler one on each side of middle. *Scutellum* transverse, within a depression. *Elytra* not much wider than prothorax; with rather large shining transverse granules intermixed with smaller ones; interstices wide, the 4th rather narrow. *Pygidium* distinctly carinate and very coarsely

pubescence; prothorax at sides, base, apex, and along middle with yellowish pubescence, in places mixed with white; elytra with short stripes of whitish pubescence on each of the interstices, causing an appearance as of three feeble somewhat curved fasciæ, one at base, one behind middle and one at apex.

Eyes large, convex, distant. *Rostrum* short, stout, straight; densely punctate; longitudinally grooved. Antennæ short, inserted in middle of rostrum; scape slightly longer than club and much shorter than funicle; 1st joint of the latter almost twice the length of 2nd. *Prothorax* large, depressed along apex of median line and subcarinate at base; a distinct impression on each side at base and a feebler one on each side of middle. *Scutellum* strongly transverse. *Elytra* slightly wider than prothorax; feebly granulate; interstices moderately wide and feebly convex. *Propygidium* large; pygidium non-carinate. *Legs* moderately long; four posterior femora feebly, the anterior moderately strongly dentate; claw-joint very distinct. Length $3\frac{1}{2}$, rostrum $\frac{3}{5}$; width $1\frac{3}{5}$ mm.

Hab.—Rottnest Island, W.A.

One specimen is considerably larger ($4\frac{1}{2}$ mm.) and its clothing is of a dingy white. The species is very close to *querulus*, Pascoe, from which, however, it differs in the insertion of the antennæ, basal impressions of prothorax shallower, 3rd tarsal joint narrower, &c. I do not know the ♀.

LÆMOSACCUS BREVIS, n.sp.

Black; antennæ, knees, tibiæ and tarsi red. Upper surface irregularly and rather sparsely clothed with moderately long yellowish pubescence.

Eyes rather large, round, convex, distant. Rostrum short, stout, almost straight; densely punctate and feebly grooved at base, shining and almost impunctate on apical half. Antennæ short, inserted in middle of rostrum; scape the length of club but shorter than funicle; 1st joint of the latter distinctly longer and stouter than 2nd. *Prothorax* feebly carinate in middle, depressed along median line towards apex; a feeble depression on each side

of base and a still feebler one on each side of middle. *Scutellum* transverse, within a depression. *Elytra* subquadrate, slightly wider than prothorax; feebly granulate; interstices moderately wide and flat. *Pygidium* scarcely carinate. *Legs* short; femora scarcely thickened, the anterior feebly dentate, the four posterior edentate. Length $2\frac{4}{5}$, rostrum $\frac{1}{2}$ (vix); width $1\frac{1}{2}$ mm.

Hab.—Mount Barker, W.A.

A short, robust species, allied to *querulus* and the preceding.

LÆMOSACCUS JUDAICUS, n.sp.

♂. Head, basal two-thirds of prothorax, under surface, and base of femora piceous-black; the rest dull red. Whitish pubescence forming a feeble spot on each side of middle of prothorax and clothing base and apex of median line; elytra with a rather large subtriangular scutellar patch, a feeble transverse fascia at basal third, and a still feebler one at apical third.

Eyes large, rounded, somewhat depressed, moderately separated. Rostrum moderately short, strongly curved, sides near base flattened; basal half strongly, the apical feebly punctured; above antennæ appearing fractured. Antennæ short, inserted about middle of rostrum; 1st joint of funicle almost as wide as long, 2nd feebly, the others strongly transverse. *Prothorax* depressed along median line and bilobed in front; scarcely depressed on

LÆMOSACCUS MELANOCEPHALUS, n.sp.

Red; head, pygidium and under surface black. Very feebly pubescent.

Eyes rounded, somewhat depressed, distant. Rostrum moderately short, curved, subcylindrical, feebly increasing in width to apex; sparsely punctate. Antennæ short, inserted slightly nearer base than apex of rostrum; scape the length of club; two basal joints of funicle large, moderately long, subequal. *Prothorax* with a feeble median line; a moderately distinct elliptic impression on each side at base. *Scutellum* small, shining, within a depression. *Elytra* scarcely wider than prothorax, considerably longer than wide; interstices convex, narrow, not much wider than striæ. *Pygidium* small, almost concave, base with a short shining carina. *Femora* edentate; claw-joint very small, scarcely extending beyond lobes of 3rd. Length $2\frac{1}{3}$, rostrum $\frac{1}{2}$; width 1 (vix) mm.

Hab.—Swan River, W.A.

Differs from *cryptonyx* in the clothing, from *variabilis*, *rufipennis* and *ventralis* by the rostrum, and from *instabilis* by the insertion of the antennæ.

L. OCULARIS, Pasc. *Hab.*—King George's Sound, W.A.

L. LONGICEPS, Pasc. *Hab.*—Cairns, N.Q.

L. ELECTILIS, Pasc. *Hab.*—S.A.

L. QUERULUS, Pasc. *Hab.*—S.A.

L. TARSALIS, Pasc. *Hab.*—Swan River, W.A.

Subfamily MENEMACHIDES.

ACICNEMIS SORORIA, Pasc. *Hab.*—Somerset (Macleay Museum).

ACICNEMIS MERIONES, Pasc. (Journ. Linn. Soc. Zool. 1872, Vol. xi. p. 462, pl. x. fig. 5). *Hab.*—Cairns (Macleay Museum). Originally described from Batchian.

Phæsomerus.

Mr. Wollaston* rejected this genus from the *Cossonides*, and believed it to be related to *Mecopus*. I myself prefer to regard it as being allied to *Acicnemis* and *Berethia*.

Phæsomerus notatus, Pasc. (*l.c.* p. 490, pl. xiii. fig. 2). *Hab.* —Cairns (Macleay Museum). Originally described from New Guinea.

Subfamily ZYGOPIDES.

Mecopus phthisicus, n sp.

♂. Piceous-brown, subopaque. Eyes bordered beneath with white scales; prothorax with a distinct whitish median stripe and two less regular stripes on each side, a few white and ochreous scales scattered about base: scutellum with dense white scales: elytra with whitish scales disposed in spots at the sides and in short lines on the disc, brown and ochreous scales elsewhere. Under surface with white and pale yellow scales on sterna and bordering abdomen, the 1st and 2nd segment narrowly edged with white. 3rd-5th very densely squamose at the sides, the scales continued across 4th-5th; legs with white scales, the posterior tibiæ naked except for a large patch on apical half. Apical half of 1st joint of anterior tarsi with long soft curved hair.

Eyes finely separated. Rostrum long, curved; rather strongly

tate, the latter finely, the former moderately strongly. *Legs* very long; posterior femora bidentate; 1st joint of anterior tarsi curved and about two-fifths the length of tibiæ. Length 9, rostrum 6½, anterior legs 17; width 3⅔ mm.

♀. Differs in being smaller, clothing more obscure, rostrum and legs shorter, posterior femora longer than anterior, 1st joint of anterior tarsi finely setose beneath, pectoral spines absent and the elytra slightly wider than prothorax. Length 7, rostrum 2⅔, anterior legs 8; width 3 mm.

Hab.—Endeavour River, N.Q. (Macleay Museum).

Differs from *tipularis*, Pascoe, in having only two teeth to the posterior femora, pectoral spines longer and projecting beyond prothorax, much longer rostrum and different clothing.

BRENTHIDÆ.

CYPHAGOGUS ODEWAHNI, Pasc.—Mr. Pascoe's description of this species is very unsatisfactory; but as the legs are described as being the same as in *adsena*, and as of that species the posterior tibiæ are described as being "not longer than the basal joint of the same pair" (of tarsi) I can be confident (presuming the quotation to be correct) that I have not seen it.

CYPHAGOGUS DIORYMERUS, n.sp.

Dark brown (almost black), shining; each elytron with a yellow stripe commencing at the shoulder and continued to but becoming feebler towards apex; under surface and legs more or less diluted with red. Prothorax at sides and the four anterior legs with sparse yellowish hair, apex of elytra and posterior femora more densely clothed with longer hair.

Head smooth and impunctate; longer than rostrum, near base very feebly constricted. Rostrum impunctate, scarcely longer than the width across eyes. Antennæ with the apical joint rather strongly compressed. *Prothorax* with the apical half strongly compressed at the sides and flattened above; median line narrowly impressed; distinctly punctate, the punctures at apex somewhat rugose. *Elytra* almost the width of prothorax, parallel-

sided to beyond the middle; narrowly striate, the alternate inte stices seriately punctate and wider than striæ. Basal segmen of *abdomen* strongly convex, not longitudinally impresse Anterior *femora* stout, intermediate pedunculate, posterior pedu culate, the swollen portion commencing immediately behind elytr with a large obtuse tooth and internally bisulcate; anterior tibi serrate externally, terminal hook the length of 1st tarsal joi posterior tibiæ as long as two following joints combined, strong curved at base, dilated and rounded towards apex, apex mul dentate. Length (rost. incl.) 7, width $1\frac{1}{6}$ mm.

♀. Differs in being somewhat paler, the swollen portion of t posterior femora very feebly sulcate and with sparser hair.

Hab.—Tweed and Richmond Rivers, N.S.W.

CYPHAGOGUS DELICATUS, n sp.

Bright red, shining, prothorax somewhat darker; elytra wi two large black subquadrate spots about the middle. Prothor and legs feebly pubescent; alternate interstices of elytra wi regular erect setæ.

Head smooth, a small puncture between eyes, near base strong constricted. Rostrum the length of head to constricti Antennæ with three apical joints forming a feeble club. *P thorax* somewhat pear-shaped; impunctate; without median li

tarsi stouter. A small specimen (4 mm.), also from the Tweed River, differs in being more brightly coloured, the elytral spots combined to form a wide fascia, and the posterior tibiæ stouter.

I have a specimen from Tasmania (Mr. A. Simson's No. 2641) which appears to belong to this species, but it has unfortunately lost the elytra.

CYPHAGOGUS SUSPENDIOSUS, n.sp.

Bright red, shining; elytra obscurely tinged with black about the middle. Prothorax at the sides and the legs feebly pubescent; elytra with elongate setæ on the alternate interstices.

Head smooth, near base deeply constricted, the part behind the constriction much lower than in front. Rostrum not much longer than wide, and feebly but moderately distinctly punctate and with a very feeble longitudinal impression. Antennæ as in the preceding species. *Prothorax* somewhat pear-shaped, finely punctate, the median line almost invisible. *Elytra* much as in the preceding, except that the alternate interstices are less coarsely punctate. *Metasternum* and basal segments of abdomen feebly impressed along middle. Anterior *femora* stout, intermediate clavate and feebly dentate, posterior pedunculate; posterior tibiæ longer than three basal joints of tarsi. Length 5½, width ⅘ mm.

Hab.—Bindogundra (Mr. J. Harris), Tamworth, Forest Reefs, N.S.W. (Lea).

May be readily distinguished from the preceding species by the much greater constriction of the head at the base, shorter tarsi, stouter intermediate femora, absence of elytral spots, &c; the prothorax is also considerably longer and narrower.

IONTHOCERUS OPHTHALMICUS, Pasc. *Hab.*—Tweed and Richmond Rivers, N.S.W.

CEROBATES AUSTRALASIÆ, Fairm. *Hab.*—Tweed and Richmond Rivers.

TRACHELIZUS HOWITTI, Pasc. *Hab.*—Sydney, Tamworth, Forest Reefs, Galston, N.S.W.

CORDUS HOSPES, Germ. *Hab.*—N.S.W.; Victoria; S. and Australia. In nests of ants, termites, and native bees.

EUPSALIS PROMISSUS, Pasc.—Mr. Pascoe's specimens were f Batchian. I have a pair from Port Darwin, given to me by Masters.

ECTOCEMUS PTERRYGORRHINUS, Gestro.—Appears to b common Queensland insect, but is as yet unknown from ! South Wales.

MESETIA AMŒNA, Blkb.—The ♀ differs from the ♂ in ha the antennæ inserted closer to base than apex, the rostrum fectly cylindrical in front of the antennæ, and these shorter stouter.

HORMOCERUS RETICULATUS, Fabr.—Some years ago I recei three specimens of this species from the Australian Museum coming from North Queensland.

CEOCEPHALUS EXOPHTHALMUS, n.sp.

♂. Brownish-red, shining; apex of prothorax, apex and bas femora tinged with black. Squamose at base of rostrum, aro eyes, at base of prothorax and elytra, about coxæ and at apex abdomen.

Head deeply constricted immediately [illegible]

♀. Differs in being somewhat paler and with a more cylindrical rostrum.

Hab.—Cairns, N.Q. (Macleay Museum).

Differs from *internatus* in being narrower, rather highly polished, the 1st sutural stria not bifurcate near apex, and with much feebler punctures and striæ; *tenuitarsis* is described as having the elytra "sulcato-foveatis."

SCHIZOTRACHELUS DICHROUS, Lacord.—Appears to be a common species from Cairns to the Richmond River. My specimens vary in length from 9 to 25 mm.

ANTHRIBIDÆ.

BYTHOPROTUS LINEATUS, Pasc.—Mr. Pascoe described this species as coming from Aneiteum in the New Hebrides; in Masters' Catalogue it is recorded as from Lizard Island; the mistake doubtless arose from the description appearing immediately after some species described from the latter place.

BRUCHIDÆ.

This family does not appear to be numerously represented in Australia. Only four species of the genus *Bruchus*, of which, moreover, three have been introduced, have as yet been recorded.* Of these *B. quadriguttatus* is unknown to me; *B. obtectus* I have from New South Wales and Western Australia; *B. chinensis* from North Queensland, New South Wales and Western Australia; and *B. pisi* from England. I can add to the list only six species, all of which appear to be undescribed.

Following is a Table of the Species:—

Antennæ pectinate in ♂	*chinensis*, Thunb.
Antennæ at most serrate.	
Femora edentate	*perpastus*, n.sp.
Posterior femora dentate.	
Prothorax and elytra red	*semicalvus*, n.sp.
Prothorax and elytra black.	

* *B. quadriguttatus* in Mast. Cat., and *B. chinensis*, *obtectus* and *pyri* of H. Tryon in Trans. Nat. Hist. Soc., Brisbane, Vol. i, 1894.

Prothorax and elytra black.	
Antennæ black, the apical and basal joints red..	*obtectus*, Say.
Antennæ black, basal joints almost black.....	*maestus*, n.sp.
Antennæ black, basal joints red...	*depicatus*, n.sp.
Antennæ entirely red.	
Posterior tarsi red.....	*modicus*, n.sp.
Posterior tarsi black.....	*diversipes*, n.sp.

BRUCHUS PERPASTUS, n.sp.

Black, spurs of posterior tibiæ red. Uniformly clothed with greyish pubescence, slightly variegated with sooty on the elytra.

Head not carinate; eyes almost approximate. Antennæ stout, scarcely serrate. *Prothorax* strongly transverse, sides strongly rounded, apex wider than head, base strongly bisinuate, scutellar lobe rounded, posterior angles acute. *Scutellum* triangular. *Elytra* scarcely longer than wide, sides and shoulders rounded. Posterior *femora* edentate. Length 3 mm.

Hab.—Behn River, E. Kimberley, W.A. (Mr. R. Helms).

A species with an almost circular outline and which, on account of its comparatively narrow head, perfectly triangular scutellum, dark legs and edentate femora, should be easily recognised amongst the Australian *Bruchi*. In appearance it resembles many of the *Dermestidæ*, such as *Trogoderma* and *Anthrenus*. The punctures are rather smaller than is usual.

The punctures are decidedly stronger than is usual. Amongst the Australian *Bruchi* it should be easily recognised on account of its colour. Of the species described in Schönherr's great work it appears to be closest to the Brazilian *B. suturalis*.

BRUCHUS MÆSTUS, n.sp.

Black; 2nd and 3rd joints of antennæ almost black, four anterior tibiæ obscure brown. Obscurely variegated with whitish and greyish pubescence, the pygidium with three obscure whitish lines.

Head feebly carinate between eyes. Antennæ not very stout, joints 5th-10th serrate internally. *Prothorax* slightly wider than long, sides very feebly incurved to apex, apex narrower than head across eyes; scutellar lobe truncate, as also the base on each side of lobe; rather coarsely punctate. *Scutellum* obtriangular, feebly bilobed. *Elytra* shaped much as in the preceding. Posterior *femora* feebly dentate, posterior tibiæ rather strongly compressed. Length 2½ mm.

Hab.—Forest Reefs, N.S.W.

The shape of the prothorax is the most distinctive feature of this species.

BRUCHUS DESPICATUS, n.sp.

Black; three basal joints of antennæ and the legs (except basal half of femora and base of posterior tibiæ) red; tarsi dusky. Clothed with greyish pubescence, obscurely variegated with whitish spots; clothing denser at sides of sterna and abdominal segments than elsewhere.

Head obsoletely carinate between eyes. Antennæ short and stout, joints 4th-10th serrate internally. *Prothorax* moderately transverse, sides very feebly bisinuate, apex narrower than head across eyes; scutellar lobe somewhat rounded, from lobe to sides almost truncate. *Scutellum* very feebly bilobed. *Elytra* noticeably longer than wide, the sides and shoulders feebly, the apices strongly rounded. Posterior *femora* feebly dentate. Length 2½ mm.

Hab. Burwood, Sydney, N.S.W.

All my specimens were beaten from thistles.

Hyperaxis Mastersii, n. sp.

Black, the antennæ and legs (except bases of femora and the claw-joints) red. Uniformly clothed with greyish pubescence.

Head obsoletely carinate between eyes. Antennæ moderately stout, joints 5th–10th transverse and feebly serrate. *Prothorax* feebly transverse, sides and apex rounded, the latter narrower than head across eyes, base (except for acutellate lobe, which is widely rounded) truncate, rather coarsely punctate. *Scutellum* transverse, very feebly bilobed. *Elytra* elongated much as in the preceding, but the striation less distinct. Posterior femora acutely dentate. Length 7½ mm.

Hab. Swan River.

I have four specimens from Geraldton which in structure and in the colour of the legs and antennæ I cannot distinguish from this species, but which differ in having the scutellum obsolete and the elytra more or less feebly corrugated with whitish clouds (not somewhat after the fashion of *obtectus*

are black except at apex of femora and tibiæ, the intermediate tibiæ are sometimes (except at extreme base) of a dingy red. I have numerous specimens from Western Australia (Bunbury, Mount Barker and Albany) possibly belonging to this species, but which differ in being larger, and in being usually slightly variegated with elongate spots of whitish scales; but the shape and variation in colour of the legs are the same.

CHRYSOMELIDÆ.

MONOLEPTA TRIFASCIATA, n.sp.

Pale stramineous, antennal joints (from the 5th) infuscate at apex; elytra with three complete transverse orange-brown fasciæ, one at base (subtriangularly produced on suture), one (slightly curved) across middle, and one at apex.

Head very finely punctate, a transverse curved sulcus between eyes, these larger than usual. Antennæ just passing median fascia, 1st joint slightly longer than 4th or 2nd-3rd combined, 3rd longer than 2nd. *Prothorax* almost twice as wide as long, densely and very finely punctate, median transverse impression distinct. *Elytra* with larger but not much more distinct punctures than on prothorax, each with an appearance as of three feeble longitudinal veins. First joint of posterior *tarsi* about once and one-third the length of the rest combined. Length 3⅔, width 2 mm.

Hab.—Forest Reefs, N.S.W.

A very distinct species, apparently not close to any of those tabulated by the Rev. T. Blackburn. The elytral fasciæ are *now* of the colour described, but were almost scarlet when the insects were alive.

MONOLEPTA RUBROFASCIATA, n.sp.

Head red, the sides and front blackish; antennæ piceous-brown, the basal joint but little paler; prothorax red, with or without a large blackish blotch towards each side in front; scutellum red; elytra deep shining black, a transverse, somewhat curved red fascia (not extending to the sides) across middle. Under surface piceous, the prosternum red (or red, metasternum piceous); legs pale testaceous, tarsi, tibiæ and apex of femora infuscate.

Head finely punctate: a transverse curved sulcus between eyes, an appearance as of three feeble tubercles between antennæ. Antennæ extending beyond elytral fascia, 1st joint curved, the length of 4th, 3rd very little longer than and almost as stout as 2nd. *Prothorax* about once and one-third wider than long, sides narrowly margined and feebly incurved to near base; indistinctly punctate; without transverse impression. *Elytra* about twice as long as wide, moderately densely and (for the genus) very strongly punctate. First joint of posterior *tarsi* the length of the rest combined. Length $3\frac{2}{3}$, width 2 (vix) mm.

Hab.—Tamworth, Dalmorton, N.S.W.

In the tabulation this species would fall beside *picticollis* Blackburn, from which it differs in the depth of its colour, but especially by its very much coarser elytral puncturation. In five specimens under examination three have the prothorax immaculate.

MONOLEPTA ACACIÆ, n.sp.

Testaceous; antennæ (except four or five basal joints) infuscate; prothorax with a dark brown median line which is continued along suture of elytra to apex; scutellum dark brown. Under surface and legs slightly paler than above.

middle of base, antennæ scarcely infuscate; prothorax with a moderately wide dark brown line in middle, the sides tinged with brown; scutellum brown; elytral suture brown. Under surface piceous-brown, legs very pale.

Head distinctly punctate, a transverse curved sulcus and two small tubercles between eyes. Antennæ passing middle of elytra, 1st and 4th joints subequal, 3rd slightly longer than 2nd. *Prothorax* about once and one-half wider than long, not very distinctly punctate, transverse impression distinct towards the sides only. *Elytra* densely, moderately strongly and regularly punctate. First joint of posterior *tarsi* slightly longer than the rest combined. Length 3, width 1½ (vix) mm.

Hab.—Swan River, Geraldton, W.A.

Close to *M. Froggatti*, Blackburn, but of a shorter and more compact form, the head with a longitudinal spot, prothorax with a median vitta and less distinctly impressed, the sutural darkening very narrow, &c. From the preceding, to which it is perhaps closer, it differs in its spotted head, dark under surface, clearly punctate elytra and shorter antennæ.

M. ROSEA, Blkb. *Hab.*—Tweed, Richmond and Clarence Rivers.

M. ALPINA, Blkb. *Hab.*—Tasmania, Victoria, New South Wales.

M. BENALLÆ, Blkb. *Hab.*—Bungendore, Sydney, Armidale, N.S.W.

M. IMPLICATA, Blkb. *Hab.*—Forest Reefs, Galston, Tweed River, N.S.W.

M. PICTICOLLIS, Blkb. *Hab.*—Benalla, Vic.

M. FROGGATTI, Blkb. *Hab.*—Galston.

M. NIGRICORNIS, Blkb. *Hab.*—Sydney, Tamworth.

M. ORDINARIA, Blkb. *Hab.*—Braidwood, Galston, Gosford, Sydney.

M INCONSPICUA, Blkb. *Hab.*—Galston.

M. SUTURALIS, Boisd. *Hab.*—Sydney.

EULINA CURTISI, Baly.—This species was described from a unique and possibly very old specimen. I have very little doubt but that I have it, supposing the type specimen to have been discoloured with age. Mr. Baly describes the antennæ as "black"; in the majority of my specimens they are dull testaceous, the apex of each sometimes fuscous; the vertex is sometimes fuscous, but usually concolorous with the rest of the head. The prothoracic blotch is variable in size and shape, and if I recollect aright is more pronounced after than before death. Baly says: "Beneath fulvous, sides of the pleuræ narrowly marked with black. Legs yellow, knees and tarsi black." My specimens agree with this, except that the under surface could scarcely be called fulvous, though in some it is darker than in others.

Hab.—Sydney, Clarence River, N.S.W. (on *Clematis* sp.).

EULINA VITTATA, n.sp.

Elongate, subparallel, convex, glabrous, with a metallic lustre. Head obscure testaceous, with or without a dull brown blotch on vertex; antennæ testaceous, base of 1st joint, apex of 3rd, and following joints dark brown. Prothorax obscurely dark testaceous, disc darker, margins metallic-blue. Elytra blackish-brown, with numerous longitudinal pale yellowish vittæ, forming three irregular fasciæ—one at base, one just behind middle, and one near apex; the vittæ are far more numerous at sides than near suture, and each appears distinct on account of the punctures

side; sides decreasing from near apex to base; margins narrow, recurved. *Scutellum* raised, glossy, subcordate. *Elytra* subparallel, shoulders rounded, extreme apex truncate; each with ten irregular but distinct rows of punctures and a short scutellar row, near apex punctures very irregular; interstices usually much wider than punctures, especially near suture, but in places narrower. Under surface almost impunctate. Length $8\frac{1}{3}$, width $3\frac{2}{3}$ mm.

Hab.—New South Wales. I have taken this species only on one occasion, but then saw many thousands of specimens (on *Dodonæa viscosa*) near the summit of a mountain at Woolomin (about 20 miles from Tamworth).

From *E. Curtisi* this species may be distinguished by its narrower and more convex form, more metallic appearance, different colour (especially of elytra and legs), coarser punctuation, longer antennæ and somewhat differently shaped scutellum. In the present species the prothoracic punctures are continued in a double row completely across the base, which is not the case in *Curtisi*. The elytral fasciæ in that species are continuous though irregular in shape; in this they are composed of numerous vittæ.

A STATISTICAL NOTE ON VARIATIONS IN THE FLOWERS OF *ANGUILLARIA DIOICA*, R. Br.

By C. T. Musson, F.L.S.

(Abstract.)

As is well known, *Anguillaria dioica*, R. Br. (N.O. *Liliaceæ*), is widely distributed in extra-tropical Australia and Tasmania and occurs under three forms: with male flowers only, with female flowers only, and in a polygamous condition (with male and hermaphrodite flowers). But whether or no all three forms occur together throughout the area of distribution, and if so in approximately what relative numerical proportions are matters not ascertainable from present records. In the hope of stimulating enquiry, the following results of an examination of 1000 plants gathered as they came to hand in a paddock at Richmond during each of the last two flowering seasons were noted, as follows:—

1897. ♂ 510; ♀ 464; polygamous (♂ and hermaphrodite) 26.
*1898. ♂ 597; ♀ 383; polygamous (♂ and hermaphrodite) 20.

Some important meteorological differences in the two seasons were noted, as well as instances of variation in the numbers of flowers, stamens, perianth segments, and carpels, met with. From the above data it would appear that in the locality mentioned the tendency towards the condition of dioecism [illegible]

NOTES AND EXHIBITS.

Mr. Maiden contributed the following Note on a New Zealand Coprosma commonly cultivated about Sydney :—

The *Coprosma* so largely cultivated about Sydney under the name *C. lucida*, Forst., is really *C. Baueriana*, Endl. The most conspicuous difference between the two species is that *C. lucida*, Forst., has the leaves acuminate, while *C. Baueriana*, Endl., has them obtuse. Hooker f. in Flora Novæ-Zealandiæ, Part i. p. 104, gives *C. lucida*, Endl., as a synonym of *C. Baueriana*, Endl. The mistake in the gardens in Sydney may have arisen by confounding *C. lucida*, Endl.. with *C. lucida*, Forst. The error is so widespread that it seems necessary that special attention should be drawn to the matter. Credit is due to Mr. Julius Camfield, a member of my staff, who first invited my attention to the erroneous nomenclature.

Mr. Froggatt exhibited leaves of a Banksia covered with the hairy tests of the larvæ of an Homopterous insect of the family Aleyrodidæ, the remarkable white filaments forming a hairy coat over the leaves.

Mr. North exhibited the skin of a fledgling Fan-tailed Cuckoo, *Cacomantis flabelliformis*, which he had caught on the 3rd instant in a gully at Chatswood. It was being fed by its foster parents, a pair of Rock Warblers, *Origma rubricata*, whose nest was found in a dark recess in the rocks a few feet away. Usually the egg or young of this parasite is found in domed nests built in situations which are more or less exposed to the sun's rays. That this is not a solitary instance of this Cuckoo's depositing its egg in the nest of the gloom-loving species is borne out by the fact that the same pair of Rock Warblers built again in a rocky chamber about two hundred yards away from their previous nesting site. On the 15th instant, and before the nest was quite finished, it contained an egg of *C. flabelliformis*, and on the 25th instant two

eggs of *O. rubricata*, all of which were slightly incubated. This set of eggs was also exhibited.

Dr. James C. Cox showed a fine specimen of *Voluta Bednalli* Brazier, from Port Darwin, and communicated the following notes :—

This species was first discovered by Mr. W. T. Bednall of Adelaide, S. Australia. Only a single specimen of it was obtained, and it remained unique till 1893, when Mr. Sowerby of London, procured a second specimen. The one I now exhibit makes, as far as I am aware, the third specimen known. The original specimen was described by Brazier in the Proceedings of this Society, Vol. iii. 1878, p. 81, pl. viii. fig. 3. Its habitat was given as Port Darwin, N. Coast of S. Australia Length 39, diam. 15 lines. In 1880 the specimen, or a drawing of it with a description, appears to have been sent to Mr. G. F. Angas in London, who again described and figured it in the Proceedings of the Zoological Society for that year (p. 418, pl. xl. fig 1). He gives its length as 3 inches, 4 lines; width 1 inch, 4 lines (= to about 83 mm.). Sowerby's specimen was procured in 1893, and described in the Proceedings of the Malacological Society of London (January, 1894, Vol. i. pt. 2, p. 49). Mr. Sowerby concluded that Bednall's original specimen was immature, as in the specimen described by Brazier and redescribed by Angas, the outer lip is spoken of by Angas as simple. Brazier makes no mention of the outer lip, but Sowerby says "the lip is covered

Sowerby's specimen, but each of the bent angulated longitudinal markings is more blue-flamed on the concave upper surface than is represented in his figure. There is a point about this species which is worthy of note: the apex, as is pointed out by Brazier and Sowerby, is obtuse, but its summit consists of a fine very dark spine; it commences the apical whorl which is smooth, and shows a distinct line of separation from the next apical whorl; commencing from this line of union the second whorl is still quite dark red-brown for a very short space, and then divides into a light yellow-cream, brighter than the body whorls, on the upper half following the suture of the apical whorl and continuing dark below for about half the distance, ending in the third whorl, when the dark colour disappears and is uniformly of a waxy yellow as it terminates; for the next whorl faint brown transverse markings commence which gradually blend at their upper ends and terminate in the dark almost continuously interrupted marginal zone now at the apical margin of the whorls from which the longitudina arched markings are given off to the termination of the lip on the body whorl. The upper transverse narrow band of the body whorl passes just above the insertion of the lip on to the whorl above it as is well shown in Sowerby's figure, continuing round on to the next whorl just above the suture and becoming lost opposite the labial insertion. The first apical whorl I pointed out is quite smooth; the next is also smooth for a short distance from the apical union, then transverse, prominent, slightly tuberculose ribs commence till about the termination of the third whorl when they lose their prominence and tubercular form and ultimately blend into the longitudinal striæ which, as Sowerby points out, are very clear, or as Brazier expresses it "distinctly striated." The whorls are rather flattened from below the middle as they proceed upwards to the suture, giving a slight shouldered elevation on the whorls. Unfortunately a small portion of the lip of my specimen is broken towards the upper part, but what remains of it quite corroborates what Sowerby says of his specimen. My specimen comes also from Port Darwin, the Northern Territory of S. Australia.

Dr. Cox also contributed the following

Note on *Thersites pachystyla*, Pfr., var. *subfusco-zonata*, var. nov., from Queensland.

(*Thersites* — Sub-Genus *Xanthomelon* — *Pachystyla*). This species was described by Pfeiffer in the Proceedings of the Zoological Society of London for 1845 (p. 71). It has a wide range, being found on the eastern water-sheds only from Cairns in North-east Queensland on the Barron River to possibly as far south as Brisbane. It is an abundant species, and as might be expected from so extensive and varied a territorial distribution, varies very much in size, ponderability, colour, and thickness of the shell. In most localities it is found buried at the roots of trees in loose earth four or five inches below the surface, but in other localities will be secreted away in hollow timber, &c. In 1868 in my Monograph of Australian Land Shells, I mentioned that I had a very thin greenish-olive variety of this species, of comparatively very small size, measuring about 0·95 and 0·80 in the greater and less diameters and 0·60 only *of an inch* high, from Port Curtis, where and from the Port Denison district I have found it to vary most. Von Martens has given to these small varietal forms the name of "Dämeli" (Mal. Blat. xvi. 1869, p. 77). The variety which I now exhibit and of which I possess about ten mature specimens with others in the younger stages of growth, is about

yellow epidermis. The umbilicus in the young specimens is quite open and is seen to penetrate deep into the shell; in the adult specimens the umbilicus is not so decidedly covered by the dilated adnate adherent columella as in typical adult specimens of the species which is very smooth, quite unlike the characteristic coarsely granulated columella of *Thersites nigrilabris* of E. von Martens, described in 1869 (= *T. Edwardsi*, Cox, described in 1868, p. 110, Appendix Mon. Aust. Land Shells). *T. nigrilabris*, however, has not always a *very dark* peristome ("*nigrum*" in the original). I have very fine living specimens of it in which the peristome, the expanded callus over the umbilicus, and in fact the whole labrum is perfectly white, and there is not nearly so marked a subsutural dark band as there is in the specimens now exhibited of this varietal form of *T. pachystyla*, the apical whorl is quite smooth, but on the upper parts of the third and fourth and part of the last whorl faint rather waved or wrinkled striæ are plainly visible running parallel with the sutures.

An illustrative series of specimens, adult and young, was exhibited.

Dr. Cox also exhibited very fine specimens of what he looked upon as varieties of *Thersites bipartita*, Férussac, smaller than typical specimens, with the base very dark, and with a very dark, rather narrow band running parallel with the suture, the lip of the shell also inclined to a carnelian-pink. These specimens might lead off to what had been described as *Thersites Beddomei*, Braz., but the shell in question was found with larger specimens which gradually passed into the typical form. To illustrate the genus a large typical pair of *T. bipartita* were exhibited, with a pair of the same quite devoid of a dark base or coloured sutural band; also a pair subangulate at the periphery of the last whorl and depressed, from Cairns, of large size; likewise a pair of the same of smaller size, very much resembling in colour, &c., the smaller forms of *Nanina ovum* from the Philippine Islands; and two pairs of a smaller variety, much more depressed than the type,

which appeared to be referable to *T. Dunkiensis*, Forbes; also examples of *T. semicastanea*, and of *T. Bellenden-kerensis*.

Mr. Rainbow exhibited specimens of two interesting spiders from the neighbourhood of Sydney, one (*Ariamnes flagellum*, Dolesch.) a long whip-like Theridion, the other (*Leptorchestes striatipes*, L. Koch) an ant-resembling Attid. Of these the first named was obtained at Belle Vue Hill by Mr. B. G. Rye, F.E.S., and the latter was collected by the exhibitor at Botany. Both species are interesting not only on account of their form but also by their mimicry. *A. flagellum* constructs a small, loosely woven, irregular web amongst the branchlets or spurs of shrubs, and when disturbed or alarmed drops out of its web and hangs suspended by a thin silken line; owing to its colour and the manner in which it folds its legs it has the appearance of a small dead stick dangling in the air. *L. striatipes* lives on branches of trees in the company of ants, to which it bears so close a resemblance that it is exceedingly difficult to detect it; in addition to this, it adds to the deception by running forwards, backwards, and zig-zagging similarly to ants, and also carries the anterior pair of legs in front, working them the while in imitation of antennæ. They are not in the least afraid of the ants, nor do the latter take any notice of them. Their food consists of various leaf and flower insects, but they do not capture them, as other species of Attidæ do, by

NOTE.—By an oversight, the following announcement was omitted from the notice of the Meeting of October 26th, 1898 (p. 439):—

Mr. R. Greig Smith, M.Sc., Macleay Bacteriologist, was elected a Member of the Society.

WEDNESDAY, NOVEMBER 30TH, 1898.

The Ordinary Monthly Meeting of the Society was held at the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, November 30th, 1898.

The Hon. James Norton, LL.D., M.L.C., Vice-President, in the Chair.

Mr. Walter R. Harper, Ashfield, Mr. Alfred E. Finckh, Sydney, and Mr. Bertram G. Rye, F.E.S., Sydney, were elected Ordinary Members of the Society.

DONATIONS.

Russisch-Kaiserliche Mineralogische Gesellschaft zu St. Petersburg.—Verhandlungen. Zweite Serie. xxxv. Band. 2 Lieferung (1898). *From the Society.*

Académie Royale des Sciences à Stockholm—Bihang. Vol. xxiii. (1897-8) Sections 1-4: Oefversigt (Bulletin). Vol. liv. (1897). *From the Academy.*

Royal Society, London—Proceedings. Vol. lxiv. No. 403 (September, 1898). *From the Society.*

Zoologischer Anzeiger. xxi. Band. Nos. 565-571. September-October, 1898. *From the Editor.*

Natural History Society of New Brunswick, St. John—Bulletin No. xvi. (Vol. iv. Part 1, 1898). *From the Society.*

American Naturalist. Vol. xxxii. Nos. 381-382. September-October, 1898. *From the Editor.*

Stock Institute, Brisbane—Three Reports and seven Pamphlets. By C. J. Pound, F.R.M.S., Director. *From the Director.*

Perak Government Gazette. Vol. xi. Nos. 27-30. September-October, 1898. *From the Government Secretary.*

Department of Agriculture, Sydney—Agricultural Gazette of New South Wales. Vol. ix. Parts 10-11 (October-November, 1898). *From the Hon. the Minister for Mines and Agriculture.*

Madras Government Museum—Bulletin. Vol. ii. No. 2 (1898). *From the Superintendent.*

Australian Museum, Sydney—Australian Lepidoptera and their Transformations. By the late A. W. Scott, edited and revised by A. Sidney Olliff and Helena Forde. Vol. ii. Part v. Title Page and Index (October, 1898). *From the Trustees.*

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Portrait of Sir Joseph Banks, after the painting by Benjamin West. *From the Trustees, Public Library, Sydney.*

REVISION OF THE GENUS PAROPSIS.

By Rev. T. Blackburn, B.A., Corresponding Member.

Part IV.

Subgroup iv.

[Of the species forming Group vi. (as characterised in P.L.S.N.S.W. 1896, p. 638) of the genus.]

This subgroup is distinguished from the preceding ones as follows:—From the 1st by its elytral suture carinate behind (where the suture is exceptionally non-carinate the size is very small and the prothorax is non-foveolate),—from the 2nd by the comparatively close punctures of its elytral series,—and from the 3rd by the punctures of the elytral series (or at any rate of most of them) being much larger than of the adjacent interstices (the species where this character is least conspicuous are at once distinguishable from those of Subgroup iii. by their very small size); it is distinguished from Subgroup v. by its not presenting the following characters in combination, viz., elytra (viewed from the side) descending much below their point of contact with the hind angles of the prothorax, and hind angles of prothorax quite

Of the 46 names remaining (after the elimination of the 10 that I somewhat confidently deem synonyms) there are 9 that seem to represent species unknown to me. They are *discoidalis*, Chp.; *fuscitarsis*, Chp.; *fuscula*, Chp., (possibly a var. of *Atalanta*, Blackb., which, however, belongs to Subgroup iii.); *partita*, Chp.; *signata*, Boisd., (possibly = *coadnata*, Chp.); *subœnescens*, Chp.; *venustula*, Chp.; *stillatipennis*, Chp., (possibly not a member of this subgroup); *notatipennis*, Chp., (possibly a var. of *subfasciata*, Chp., as noted below).

Thus there remain 37 names which I have been able to apply confidently to insects before me. Many of them (as mentioned below in the detailed notes) are names of species of which I have seen types or quasi-types. In the following pages I describe 14 new species, so that I treat this subgroup as consisting of 51 species known to me and 9 of which I have not seen examples.

Some remarks on the characters that I have used in tabulating the species of this subgroup will be found under the heading of the following species, viz., *scutellata*, *umbrosa*, *minor*, *posticalis*, *festiva* and *apicata*.

In Part iii. of this series of memoirs (P.L.S.N.S.W. 1898, p. 220) I stated that the colours of the species forming this subgroup are not evanescent after death. I have since found that that remark was of too general a character and should have read "the colours being *rarely* metallic or evanescent after death."

Tabulated statement of the characters of the species forming Subgroup IV.

A. Size comparatively large (at least long. 4½ lines).
  B. Form strongly convex (more so than *P. intacta*, Newm.)..... variabilis, Chp.
  BB. Form much more depressed.
    C. Sides of prothorax subconfluently rugulose-punctulate..... subcostata, Chp.
    CC. Sides of prothorax sparsely and not rugulosely punctulate..... lineata, Marsh.
AA. Size notably smaller (rarely long. 4 lines).

B. Species of depressed form; elytra explanate at apex, so that from the side the suture appears mucronate. (No very small species.)
C. The punctures of the interstices much finer than of the series.
D. The seriate punctures of the elytra not particularly fine (somewhat as in *intacta*, Newm.).
E. Prothorax without well defined markings.
F. Seriate punctures of elytra becoming very coarse behind (as in *suturalis*, Germ.)..... scutellata, Chp.
FF. Seriate punctures of elytra not or but little coarser near apex..... Hera, Stäl.
EE. Middle of prothorax (as also the head and suture of elytra) black..... scaphula, Chp.
DD. The seriate punctures of the elytra much finer..... depressa, Chp.
CC. The lateral interstices with punctures as large as those of the adjacent series..... turbata, Chp.
BB. Species not of the form of the next preceding 5 species.
C. The eyes very strongly granulate.
D. Seriate punctures of elytra finer in apical quarter and not confused with coarse interstitial punctures..... umbrosa, Chp.
DD. Seriate punctures in apical quarter coarse and much confused with coarse inter-

DD. Elytral series not becoming notably coarser behind; at any rate their interstices as wide as diameter of adjacent series.
E. Basal joint of antennæ comparatively long; reaching well on to the eye.
F. Sides of prothorax conspicuously explanate. (Size comparatively large)..... pictipennis, Bohem
FF. Sides of prothorax not or scarcely explanate.
G. Elytra uniformly blackish-green.. .... æneipennis, Chp.
GG. Elytra not uniformly blackish-green.
H. Sides of elytra (viewed from the side) descending much below the prothothorax (as in subgroup v) with humeral angles subacute..... tenuicornis, Blackb
HH. Sides of elytra normally related to the prothorax.
I. Interstice between 2nd and 3rd elytral series narrowly and conspicuously carinate near apex..... lucidula, Chp.
II. Interstice between 2nd and 3rd series normal.
J. Legs black or nearly so..... complicata, Blackb
JJ. Legs testaceous or pale brown.
K. Form short, strongly convex, more or less hemispheric.
L. Hinder part of suture carinate.
M. Size moderate (long. 2½ lines or more).
N. Elytral series well defined behind.
O. Antennæ comparatively short and stout... ..... minor, Marsh.
OO. Antennæ notably longer and more slender.
P. Each elytron with a subapical V. (Head testaceous) obliterata, Er.
PP. Elytra not marked with a subapical V. (Head dark at the base)..... pulverulenta, Blackb.
NN. Elytral series obsolete behind Galatea, Blackb.

MM. Size very small (long. less than 2 lines) ..... interrupta. Chp.
LL. Suture absolutely flat (not even margined) ..... Hebe, Blackb.
*KK. Form notably less convex; not at all subhemisphæric.
L. The elytral series run normally.
M. The middle part of prosternum normal (*i.e.*, sulcate between two carinæ).
N. External elytral series coarse (as coarse as front part of those of *P. orphana*) ..... Calliope, Blackb.
NN. External elytral series notably less coarse.
O. Prothorax strongly narrowed in front ..... Calypso, Blackb.
OO. Prothorax very little narrowed in front ..... intertincta, Clk.
MM. Middle part of prosternum without sulcus or carinæ (or nearly so).
N. Punctures in the elytral series sparse, here and there twice as wide apart as the diameter of a puncture ..... transversomaculata,
NN. The punctures close and regular (or nearly so) ..... subfasciata, Chp.
LL. The elytral series run distinctly

HH. Seriate punctures much coarser.
I. The eyes normal (*i.e.*, not, or scarcely asperate).
J. The elytral interstices not, or scarcely, convex.
K. Punctures of the elytral series symmetrical..... substriata, Chp.
KK. Punctures of the elytral series unsymmetrical (*i.e.*, here and there out of line)..... ..... Clio, Blackb.
JJ. Elytra near apex conspicuously striate, with convex interstices.. Daphne, Blackb.
II. The granulation of the eyes (not coarse but) quite strongly asperate amabilis, Chp.
GG. The fine interstitial puncturation of the elytra intermixed with coarser punctures which are usually more or less seriate.
H. The seriate punctures everywhere larger and closer than the interstitial, so that the series are very conspicuous.
I. The elytral markings consist of a single conspicuous subapical black spot.. .... subapicalis, Chp.
II. Elytra not marked as *subapicalis*, Chp.
J. The front part of the prothorax widely black ..... Arethusa, Blackb.
JJ. The prothorax not widely black in front.
K. Joints 7 and 8 of the antennæ not wider than long.
L. Elytra having a wide sutural vitta darker than the general colour.
M. Elytra with an interrupted dark discal vitta..... lepida, Er.
MM. Elytra without markings (except the sutural vitta)..... mediovittata, Chp.
LL. Elytra with only the extreme sutural edging dark..... ..... modesta, Chp.
KK. Joints 7 and 8 of the antennæ wider than long.... .... festiva, Chp.

HH. The interstitial punctures (at any rate on parts of the surface) so like the seriate as to make the series indistinct and confused.

I. The elytra with sharply defined markings.

J. Head (except the labrum) entirely black..... jucunda, Chp.

JJ. Head (except base) testaceous..... scutifera, White.

I. The elytra uniformly testaceous or brownish (in dried specimens)..... Medea, Blackb.

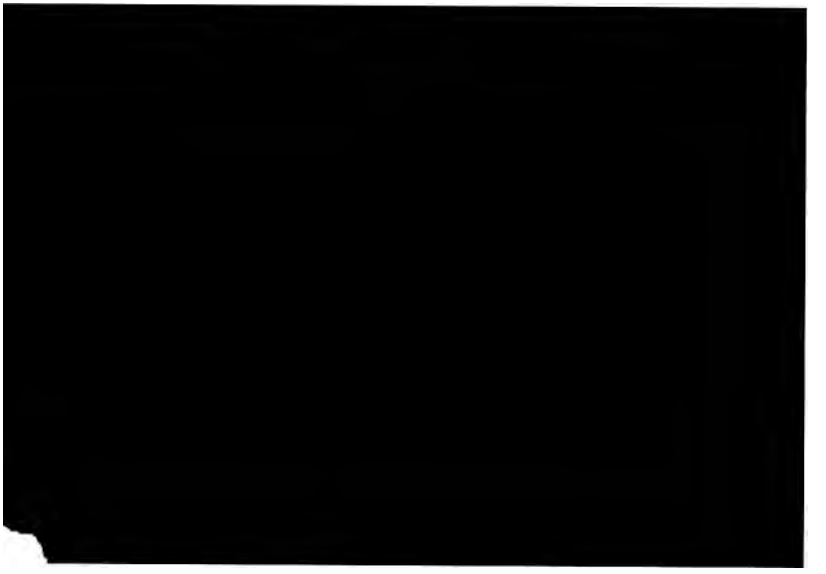
FF. Prosternum not sulcate down the middle and not (or scarcely) carinate at the sides. Not more than 5 joints in the dilated series of antennal joints.

G. Seriate puncturation (at any rate near the lateral margins) coarse, the diameter of the punctures in middle part of 9th and 10th series much greater than width of interstice between them.

H. Interstices of elytra punctured very distinctly and not very finely..... apicata, Clk.

HH. Interstitial puncturation extremely fine..... delicatula, Chp.

GG. Seriate puncturation considerably less coarse.



K. Form widely oval. Head flat and wide..... ..... nigritula, Clk.
KK. Form narrowly oval. Head comparatively narrow and convex..... .... Œnone, Blackb.
II. Elytra together fully as wide as long. Form nearly circular..... Irene, Blackb.

P. VARIABILIS, Chp.

This species has already been discussed as a member of the 1st Subgroup. It is here mentioned again on account of its presenting the characters which distinguish the 1st from the 4th Subgroup so feebly and uncertainly that it seems to be a connecting link between those subgroups.

P. SUBCOSTATA, Chp.

Another species partaking somewhat of the characters of Subgroup i. inasmuch as it is of large size and with more or less indications of prothoracic foveæ, but as these are combined with an elytral suture completely of the type of Subgroup iv., I think it may conveniently stand at the beginning of that aggregate, particularly as it would be an entirely isolated species in general appearance if it were placed among the species of the former subgroup, and is less so, I think, in the position I now give it. I have not before me an example named by Dr. Chapuis, but I feel no doubt of the correctness of my identification, although the specimen described by Chapuis was a rare variety of which I have seen only one specimen in a long series that I have examined. It is a large species (long. 4½-6 lines) of depressed and somewhat narrow form (the males less narrow than the females), the head and prothorax closely somewhat strongly and subrugulosely punctulate, the latter with more or less distinct sublateral foveæ behind which there is a tendency to gibbosity (occasionally as in the type well defined), the foveolate and gibbous portions are in some examples (*e.g.*, the type) darker than the adjacent surface. The elytra are strongly punctulate-striate with evidently convex interstices (this sculpture notably stronger than in any of the species

I have placed in Subgroup i. The antennæ are slender cylindric and decidedly elongate. The basal joint of the 4 anterior are in the ♂ is very strongly dilated, with its sides strongly rounded (not much different from that of *inæqua*, Newm.). The colour varies from castaneous with the margins of the prothorax and elytra pale yellow, and the elytral striæ dark ferruginous, through a form in which the disc of the prothorax is more or less clouded with piceous and the elytra become blackish in the lateral parts of the disc, to a form in which the whole upper surface except the front of the head and the margins of the prothorax and elytra is nearly black. The under surface and legs vary from ferruginous to piceous, the antennæ (apparently constantly) being somewhat lighter in colour than the legs. The species is common in Tasmania. I have not seen it from other localities, except a single specimen in Mr. Masters' collection ticketed "N.S.W."

P. LINEATA, Marsh.

This species is closely allied to *P. subcostata*, Chp. It differs from it in being of even more depressed form, and in the sculpture, as well as in colour and markings. The prothorax has scarcely any indication of foveæ (in some examples none at all), and is much less closely punctulate, the punctures in the lateral part being (not crowded and sub-confluent as in *subcostata*, but) widely spaced from one another. The elytral sculpture does not differ

Macleay Collection. I have collected the species in Tasmania and Victoria, and it probably occurs in New South Wales, although I have not seen an example that I can positively affirm to have been taken there.

P. SCUTELLATA, Chp.

This and the following 4 species are somewhat closely allied *inter se*, being readily distinguishable from the others of the subgroup (one or two very small species near the end of the subgroup perhaps excepted) by their oval depressed form, with the elytra quite strongly explanate at the apex which causes the suture to appear (when looked at obliquely from the side) bluntly mucronate The present species is the one of the five in which the apical flattening of the elytra is least strongly developed. It differs from the other 4 moreover in the seriate punctures of its elytra becoming very coarse in the hinder part, so that the interstices between some of the series are much narrower than the diameter of a puncture. It is of entirely testaceous colour except that the antennæ are a little infuscate towards the apex, and in some examples the seriate punctures are infuscate. The scutellum is said by Dr. Chapuis to be transverse, but I find that its appearing so depends on whether the prothorax is pushed back over the base of the elytra. I have an example named by Dr. Chapuis. The size is long. 3¼ lines. The habitat is N.S. Wales. I have seen only three examples (all females). It is to be noted that in this and the following 4 species the basal joint of the antennæ is very short and the sulcation of the middle part of the prosternum very feeble, the middle line itself being finely convex and almost (or even quite in *turbata*) raised above the lateral carinæ.

P. HERA, Stäl (? *P. virens*, Chp.).

The apical flattening of the elytra in this species is very strong. In colouring it scarcely differs from *P. scutellata* except in having a dark spot or two dark spots (varying from dark red to black, in some examples all four spots coalescing into a common fascia) on the apical declivity of the elytra, and I have not seen any

example in which this marking is not at least *traceable*. It also differs in the punctures of the elytral series not becoming coarse near the apex. From the next two species it differs very widely in colouring, and also differs from *turbata* (except rare varieties) widely in colouring and also in the sculpture of the elytral interstices. The basal joint of the 4 anterior tarsi is only feebly dilated in the male. The species seems to be widely distributed, but most plentiful in W. Australia. I have examples from S. Australia and one ticketed "Queensland," but none from Tasmania (the locality cited by its author). Mr. Lea informs me that when alive it is of a greenish colour, from which it would appear to furnish an exception to the fixity of colouring usual in this subgroup. I have an example in my collection that agrees fairly well with the description of *P. virens*, Chp., and which is certainly I think only *P. Hera* with a greenish tone of colour and the apical elytral marking very faint; this determination, however, is not much more than a conjecture, as the description of *P. virens* is very meagre. One of my examples of *P. Hera* was named by Dr. Chapuis.

P. SCAPHULA, Chp.

This species is very distinct on account of its sharply defined markings, which are probably not very variable. Apart from its markings it is rather close to *P. Hera*, but differs from it *inter*

P. DEPRESSA, Chp.

Compared with *P. Hera* this species is evidently wider and more depressed, with the apical flattening of the elytra somewhat less pronounced. Its most notable distinction among its immediate allies consists in the fineness of the punctures in the elytral series, which are not much different in size from those of *P. morio*, Fab., (as described earlier in this revision). The insect is of a red-brown colour, with the exception of a large suboval black blotch on the disc of each elytron immediately in front of the middle. Its length is 3 lines. I have seen only a single example (female) which is in the collection of Mr. Masters, so I cannot say whether the species is a variable one. It occurs in Queensland.

P. TURBATA, Chp.

This is probably the most depressed species in the genus. It is of elongate-oval form, somewhat suggestive of the Carabid genus *Silphomorpha*. The apical flattening of the elytra is scarcely less pronounced than in *P. Hera*. Its best characters amongst its immediate allies seem to lie in the puncturation of the lateral interstices of the elytra, which is as coarse as that of the adjacent series. It is extremely variable in colour and markings; the typical form is entirely testaceous, except the back of the head, the suture of the elytra (very narrowly), and a blotch on the shoulders, which are infuscate. These infuscate markings increase in a variable manner till in the extreme form known to me the back of the head and a wide sutural and a wide submarginal vitta (the vittæ uniting close to the apex) are black. The middle part of the prosternum is very narrow and not distinctly sulcate (its lateral carinæ almost non-existent). The basal joint of the 4 anterior tarsi in the male is only feebly dilated. The length is $3\frac{1}{4}$-$3\frac{3}{4}$ lines. The species is found in W. Australia. I have a specimen named by Dr. Chapuis.

P. UMBROSA, Chp.

With the two next following this species forms a small aggregate distinguished from all closely allied to it by the strong

granulation of the eyes, which it may be noted for the sake of precision are considerably more coarsely granulate than those of the common *P. orphana*, Er., and a trifle more coarsely than those of *P. intacta*, Newm. The present species is a short and broad one (the males almost subcircular), somewhat strongly convex. The sides of its prothorax are nearly straight and the front angles advanced and acute, the hind angles quite defined but blunt. The prothorax has traces (quite evident from a certain point of view) of very small sublateral foveæ. The elytral series are rather coarse, but become less so near the apex and do not run in distinct striæ, except near the apex in the females. The interstitial puncturation is non-seriate and throughout much finer than the seriate. The lateral carinæ of the middle part of the prosternum are well defined and very evidently higher than the middle line. The antennæ are elongate and subfiliform, but the joints 5 to 10 are individually compressed and triangular, some of them not much longer than at the apex they are wide; the basal joint is elongate, reaching well on to the eye. The basal joint of the 4 anterior tarsi in the male is only moderately dilated, with sides very little rounded. The species is variable in size as well as in colour and markings The size is long. 2¼-3 lines. A well marked specimen is of pale brown colour with some obscure infuscation on the head, two reddish lines on the disc of the pro-

P. ANXIA, Chp.

An extremely isolated species on account of the shape of the elytra, which are exceptionally narrow at the apex (so that compared with the generality of *Paropsis* the insect appears almost pointed behind) and are concave in the sutural region near the apex (so that the sutural carina seems to run at the bottom of a concavity) The basal joint of the 4 anterior tarsi in the male is somewhat more dilated than in *umbrosa*, and the apical ventral segment of the same sex bears a large concavity. The middle part of the prosternum is narrower than in *umbrosa*, with its lateral carinæ less elevated. The elytral series are very strong, especially towards the apex, where they become confused with some interstitial punctures of similar size. The whole insect is of red-brown colour, except some small black blotches (very variable in number and disposition) near the apex of the elytra. The convexity of this species is not much different from that of *umbrosa*. The size is long. 3½ 3¾ lines; the habitat W. Australia. I have an example named by Dr. Chapuis I have not seen a female of this insect. The antennæ are much more slender than those of *umbrosa*, with all the joints much longer than wide, the 2nd joint about the same length as the 4th. This species has no humeral callus.

P. NIGROCONSPERSA, Clk.

This species is allied to *anxia*, but with the humeral callus feebly indicated, the elytra rounded at the apex and not concave in the sutural region, and not having the apical ventral segment impressed in the male. The tarsal, antennal, and prosternal characters are as in *anxia*. The colours and markings are much like those of *anxia*, but the general colour is usually testaceous rather than red-brown, and the black spots and blotches on the elytral interstices are much more numerous (though very variable) and are distributed over the whole of the elytra (not, as in all the examples I have seen of *anxia*, limited to the apical part). The species occurs in S. Australia and W. Australia. The female is

evidently more strongly convex than the male. I have an example named by Dr. Chapuis.

P. ORPHANA, Er. (*orphanula*, Chp.)

This and the next species are readily distinguishable among their immediate allies by the notable coarsening of the punctures in the elytral series near the apex, where they become so coarse that the interstices between some of the series are in their hinder part much narrower than the width of the adjacent punctures. The present species is moderately convex and somewhat widely oval (the males wider than the females). The antennæ are somewhat short and robust, with some of the joints considerably compressed and not very much longer than wide, the basal joint much shorter than in the preceding three species. The interstices of the elytra are of very unequal width *inter se*, that between the 4th and 5th series being especially much narrower than the interstices nearer the suture. It is an extremely variable species, the upper surface varying from pale green to brown, with the discal interstices more or less interruptedly dark brown or blackish. In the extreme variety before me the dark colouring of the disc of the elytra extends over the whole insect The underside is more

others is replaced by red-brown, and others are entirely of a dark brown colour which has a reddish tone in the sutural region. *P. suturalis* is a common insect in South and West Australia.

P. PICTIPENNIS, Bohem.

This species is very easily recognisable among its immediate allies by its comparatively large size and the conspicuously explanate lateral parts of its prothorax, which bear an elongate feebly impressed fovea-like furrow (in some examples scarcely traceable) at the inner margin of the explanate portion. It is so well and fully described by its author that it will be sufficient here to say that it is a strongly convex insect of subovate form and of testaceous or reddish colour with (in a typical example) the elytra somewhat darker except the lateral margin and two inconspicuous fasciæ, the one a little in front of, the other a little behind, the middle. Varieties have the general colour of the elytra lighter, so that the fasciæ are scarcely traceable; and others have the general colour of the elytra darker, but in these the dark colouring is much reduced in area, so that the elytra would be best described as testaceous, with the seriate punctures blackish and three very irregular sinuous and interrupted fasciæ of blackish colour. The antennæ are black (except near the base), elongate and filiform, but somewhat robust, with all the joints considerably longer than wide and but little compressed. The basal joint of the four anterior tarsi of the male is strongly dilated. This species was sent to me from Dr. Chapuis' collection as *P. minor*, Marsh., but it does not agree with Marsham's description or with Marsham's reputed type in the Macleay collection. It is found in N.S. Wales and Victoria. Its size is long. 3-3¾ lines.

P. ÆNEIPENNIS, Chp. (*Ænea*, Blkb.).

I have considerable hesitation in placing this species here; in fact it is intermediate between Subgroups i. and iv., its almost absolutely non-carinate elytral suture associating it with the former, while its small size and non-foveolate prothorax refer it

to the latter. In my tabulation of the subgroups I have given "size larger than long. 3 lines" as one of the characters of Subgroup i. for the purpose of making it clear that this and one or two other very isolated small species are not to be referred to that aggregate; excluded from it there can be no doubt about placing them here. In my description of *P. œnea* (Trans. R. Soc., S.A., 1890, p 143) I expressed some doubt as to whether that insect might not be a form of *œneipennis*, Chp., which is very unsatisfactorily described, and of which I have not a specimen named by its author. On further consideration I think it best to regard the two as probably identical, although no doubt there is some uncertainty about the matter. *P. œnea* is fully described in the memoir cited above. It is incapable of confusion with the other species known to me in this subgroup on account of the uniform greenish-black colour of its elytra, of which both the seriate and interstitial puncturation is exceptionally fine.

P. TENUICORNIS, sp.nov.

Sat breviter ovata; sat fortiter convexa; nitida; testacea, elytris pallide viridescentibus (his nonnullorum exemplorum notulis nonnullis sat læte viridibus ornatis); capite minus crebre punctulato; antennis gracilibus filiformibus valde elongatis, articulis

the 1st subgroup, and the elytra much wider than the prothorax (so that viewed from the side they descend much below the level of that segment) connecting it with the 5th subgroup; but its prothorax entirely devoid of foveæ and with well defined hind angles prevents its confusion with either of those aggregates.

N.S. Wales; Richmond River District.

P. LUCIDULA, Chp.

Another somewhat isolated species owing to the exceptional sculpture of its prothorax (which bears on the lateral portion, on either side, two subparallel elongate furrows with the space between them somewhat elevated—this sculpture, however, feebly marked in some examples) as well as the strong (less strong in some examples) convexity near its apex of the interstice between the 2nd and 3rd elytral series. The insect is entirely testaceous or testaceous-brown, except that in some examples some of the interstices on the elytra are interruptedly whitish. It is very nitid, strongly convex and somewhat elongate-oval in form, the outline of the elytra (viewed from the side) strongly sinuous. The elytra are scarcely striate, their seriate punctures somewhat strong and not very closely placed in the series, the interstices finely and sparsely punctured. The antennæ are robust and somewhat short, with the external joints considerably compressed and not very much longer than wide. the basal joint somewhat elongate and reaching well on to the eye. In the male the basal joint of the four anterior tarsi is somewhat strongly dilated, with its sides considerably rounded. I may say that the whitish colour of some of the elytral interstices in some dried examples of this insect are suggestive of the probability that when alive its elytra are striped with metallic colours, but I cannot speak positively on the point, as I have not seen living specimens. Its habitat is N.S. Wales. I have an example named by Dr. Chapuis.

P. COMPLICATA, sp.nov.

Ovata; fortiter convexa; minus nitida; supra testaceo-brunnea, capite postice et in prothorace et elytris notulis nonnullis (in

illo lineis 2 longitudinalibus anticis et maculis 2 connexis basalibus; in his utrisque sutura, arcu discoidali maculaque laterali anticis, et lineis longitudinalibus 3 posticis, externis 2 antice conjunctis) nigris; corpore subtus pedibus antennisque nigris, plus minusve (præsertim in abdomine) testaceo-variegatis; capite dupliciter (subtiliter et minus subtiliter) punctulato; prothorace quam longiori ut $2\frac{1}{2}$ ad 1 latiori, subtilius minus crebre (latera versus puncturis sat magnis nonnullis intermixtis) punctulatis, ad latera vix manifeste inæquali, lateribus leviter arcuatis, angulis anticis subacutis posticis leviter obtusis; scutello parvo; elytris haud striatis, distincte 10-seriatim punctulatis, interstitiis planis subtilissime minus crebre punctulatis, sutura postice vix carinata, parte marginali puncturis sparsis impressa; antennis ut *P. tenuicornis*. Long. $2\frac{1}{2}$, lat. $1\frac{1}{3}$ lines.

♂. Latet.

This is a very distinct species, easily recognisable by the peculiar and sharply defined markings of its upper surface. I have seen only two examples, one given to me by the late Mr. Olliff, the other belonging to Mr. Lea. The two are quite identical *inter se*, and I do not think it likely that the insect is a very variable one. Its almost flat suture renders it aberrant in this subgroup; and, apart from its small size, there might be a doubt whether it should be regarded as an aberrant member of this or the first subgroup.

N.S. Wales; Richmond River District.

distinctly punctulate with the sides more coarsely but not confluently punctured, the hind angles of the prothorax quite defined but not at all sharp, the elytra not or scarcely striate, with their seriate punctures at least fairly well defined and with a tendency to be non-symmetrical (*i.e.*, not in exact line one behind another), the interstices flat or all but flat. The present species is distinguished from the others by its elytral markings assuming the form of three wide flexuous fasciæ which run at right angles to the suture and do not reach the margins. It is also the species of widest form, the elytra being in the male fully as wide as long, and is the most strongly convex, the height of its elytra (viewed from the side) being $\frac{1}{2}$ or nearly so of the length. Its antennæ are notably shorter and stouter than in *obliterata* and *pulverulenta*, and the interstices are not quite so flat. The basal joint of the four anterior tarsi of the male is only feebly dilated, with the sides but little rounded. I have not seen, among a good many specimens, any that vary from the type except in the greater or less distinctness of the elytral fasciæ (none in which they are not quite traceable) and of the infuscation of the seriate elytral punctures. The species occurs in N.S. Wales.

P. OBLITERATA, Er.

Differs from the preceding in the markings of the elytra, which consist of (*a*) a blotch running from the humeral callus obliquely hindwards towards the suture, (*b*) a median fascia not unlike that of *P. minor* but narrower and more sinuous and abbreviated at both ends, (*c*) a subapical mark in the shape of the letter V, (*d*) a small dark sutural blotch close to the apex, (*e*) a small antemedian submarginal blotch. The above marks (or nearly all of them, the subapical V very constant) vary considerably in intensity of colouring. The species is notably less convex than *P. minor*, with much longer and less robust antennæ, the elytra of the male longer (though only slightly) than wide and the elytral interstices more flat. It is common in Tasmania and Victoria, and occurs also in S. Australia. In rare examples the elytra are almost white and the markings very faint.

P. PULVERULENTA, sp.nov.

Breviter ovata; fortiter convexa; sat nitida; flavo-brunnea, antennis (apice excepto) et capite postice nigricantibus, in elytris areis nonnullis fumicoloribus (in quibus puncturæ seriatæ nigræ sunt); capite crebre subtilius punctulato; antennis elongatis sat filiformibus, articulis omnibus quam latioribus sat longioribus; prothorace quam longiori ut fere $2\frac{1}{4}$ ad 1 latiori, confertim subtiliter (ad latera grosse nec confluenter) punctulato, latera versus late leviter impresso, lateribus leviter arcuatis, angulis anticis subacutis posticis obtusis (fere subrotundatis); elytris haud striatis, sat fortiter 10-seriatim punctulatis, puncturis in seriebus parum symmetrice dispositis, interstitiis planis distincte punctulatis, sutura postice perspicue carinata, parte marginali quam series externæ vix magis fortiter punctulata.

♂. Tarsorum anticorum 4 articulo basali parum fortiter dilatato, lateribus vix arcuatis. Long. 3, lat. $2\frac{2}{3}$ lines.

The elytral markings of this species are evidently different from those of its near allies, though partaking of the same general character. They consist of about eight or nine patches on each elytron slightly darker than the general surface and with somewhat the appearance of being dusty. These patches are placed with more or less regularity in three longitudinal rows, and such of the seriate punctures as happen to be on them are black. The antennæ are a trifle shorter and more thickened towards the apex

flectitur, in exemplis nonnullis cum illa media conjuncta): antennis minus elongatis minus gracilibus; prothorace quam longiori ut vix $2\frac{1}{4}$ ad 1 latiori, lateribus parum arcuatis; cetera ut *P. pulverulenta*. Long. $2\frac{1}{2}$-$2\frac{4}{5}$, lat. $1\frac{4}{5}$-2 lines.

The faintly defined markings on the elytra of this species bear a general resemblance to those of *P. obliterata* (as described above) except the subapical one, which consists of a dark patch on the 8th interstice, the middle of which is slenderly connected (in some examples not connected) with another and similar patch on the 4th interstice. The markings are quite traceable in all the specimens I have seen, though very faint in some. Apart from colour and markings, *P. Galatea* differs, *inter alia*, from *obliterata*, Er., and *pulverulenta*, Blackb., by its notably shorter and more robust antennæ, from *minor*, Marsh., by its considerably less convex form, and from all of them by the puncturation of its elytra, the seriate punctures becoming somewhat finer near the apex than they are in front, and the interstitial punctures being closer and stronger than in the other species, so that some of the series (especially the 3rd) are in their subapical portion not very distinct from the general puncturation of the interstices, which are absolutely flat.

W. Australia; sent by Mr. Lea.

P. INTERRUPTA, Chp.

This species is readily recognisable by the characters indicated in the foregoing tabulation. It is of very small size (long. $1\frac{1}{2}$ lines), with robust antennæ, some of the external joints of which are very little longer than wide, and of testaceous-brown colour with the suture of the elytra (except close to the base) widely and two wide vittæ (these coalescing at the base and apex) of a much darker brown colour. I have seen only one example, which was named by Dr. Chapuis. The insect is said to be found in N.S. Wales.

P. HEBE, sp. nov.

Breviter ovalis; fortiter convexa; nitida; testacea vel rufo-brunnea, antennis (basi excepta) prothoracis disco medio et

elytris (maculis magnis 3—*i.e.*, in utroque elytro 1 basali 1 mediana sublaterali 1que subapicali—et notulis nonnullis aliis testaceis, exceptis) piceis vel rufopiceis; capite crebre subtilius punctulato; antennis modice elongatis, sat robustis, articulis omnibus quam latioribus sat longioribus; prothorace quam longiori ut $2\frac{2}{5}$ ad 1 latiori, ut caput (ad latera vix magis fortiter) punctulato, latera versus vix perspicue impresso, lateribus leviter arcuatis, angulis anticis acutis posticis subrectis; elytris haud striatis, distincte 10-seriatim punctulatis, interstitiis planis subtiliter punctulatis, sutura nullo modo carinata, parte marginali quam series externæ haud magis fortiter punctulata. Long. 2, lat. $1\frac{3}{5}$ lines.

An extremely anomalous species, with no near ally known to me. I do not know any other combining the following characters: size very small, basal joint of antennæ elongate, form subhemisphæric, suture absolutely flat (not even margined), middle of prosternum strongly sulcate with the sides of the sulcus strongly carinate. The pale marks on each elytron are a large subcircular spot between the scutellum and humeral callus, an oval spot of about the same size at the beginning of the posterior declivity and a still larger somewhat quadrate spot near the lateral margin slightly in front of the middle. These spots, with their fellows on the other elytron, are placed at regular intervals on an imaginary line that would be the circumference of a circle. The lateral margin is widely testaceous in its hinder part and there is a

N.S.W. (habitat of my own example uncertain; an example from Mr. Lea was taken in the Richmond River District).

P. CALLIOPE, sp. nov.

Sat late ovalis; modice convexa; sat nitida; testacea vel brunneo-testacea, antennis apicem versus et elytrorum interstitiis nonnullis (varie et interrupte) piceo-brunneis; capite crebre subtilius punctulato; antennis modice elongatis, sat robustis; prothorace quam longiori ut $2\frac{1}{3}$ ad 1 latiori, crebre subtiliter (ad latera magis fortiter) punctulato, fere æquali, lateribus leviter arcuatis, angulis anticis subacutis posticis subrectis; elytris distincte striatis, 10-seriatim fortiter punctulatis, interstitiis convexis minus perspicue punctulatis, sutura postice distincte carinata, parte marginali quam series externæ perspicue magis grosse punctulata.

♂. Tarsorum anteriorum 4 articulo basali minus fortiter dilatato, lateribus parum rotundatis.

A species bearing considerable general resemblance to *P. orphana*, Er., but differing from it *inter alia* in the considerably longer basal joint of its antennæ, and in the elytral series of punctures not becoming coarser towards the apex in which region the interstices are not (as they are in *orphana*) narrower than the diameter of the punctures in the adjacent series.

Tasmania.

P. CALYPSO, sp. nov.

Subovata; modice convexa; nitida; testacea, elytrorum serierum puncturis et interstitiis nonnullis (exemplis nonnullis unicoloribus exceptis) plus minusve fuscis, antennis apicem versus nigricantibus; capite dupliciter (subtiliter et subfortiter) punctulato, antennis minus elongatis, apicem versus perspicue compresso-dilatatis, articulis nonnullis quam latioribus vix longioribus; prothorace quam longiori ut $2\frac{1}{2}$ ad 1 latiori, fere æquali, ut caput (sed ad latera sat grosse nec crebre) punctulato, lateribus leviter arcuatis, angulis anticis acutis posticis subrectis; elytris haud striatis, subfortiter

10-seriatim punctulatis, puncturis in seriebus minus crebris, interstitiis planis subtiliter punctulatis, sutura postice perspicue carinata, parte marginali quam series externæ haud vel vix magis fortiter punctulata.

♂. Tarsorum anteriorum 4 articulo basali leviter dilatato, lateribus parum rotundatis. Long. 2-3, lat. 1⅝-2 lines.

This species is closely allied to the preceding one and the following one. The system of colouration is very similar in the three, consisting of a general testaceous or brownish surface, with the elytral series often infuscate and the interstices usually dark brown (more or less partially and interruptedly). In a typical example of the present species the 5th, 7th, and 9th interstices are dark except at the base and apex, but not so dark about their middle as elsewhere. It differs from *P. Calliope inter alia* by the considerably less coarser punctures of its elytral series, and from *P. intertincta*, Clk., by its prothorax being quite strongly narrowed anteriorly. From the species which immediately follow *intertincta* it is very distinct both by the style of its markings and by the middle part of its prosternum being (as in the majority of *Paropses*) longitudinally sulcate almost from base to apex, with the edges of the sulcus distinctly carinate, and from *P. coadnata*, Chp., by its elytral series of punctures being equally (or nearly so) spaced one from another.

N.S. Wales; taken by Mr. Lea at Dalmorton.

colour markings and size. A fully marked example is of pale testaceous-brown colour, with the antennæ (except at the base) and the back of the head blackish, the scutellum dark brown and a number of blackish markings on the elytra consisting of patches on the interstices so arranged as to form a kind of festoon extending from one humeral callus to another and crossing the suture about its middle, and another coalescing with it on the suture, and having its extremities not far from the lateral margin and the apex on each elytron; each humeral callus and the subapical extremity of the hinder festoon being also connected by a blackish vitta which runs along the inner edge of the marginal part of the elytra. There are also some whitish lines on the elytra which are probably silvery in living specimens. Nearly all the markings on the elytra are liable to be wanting, but there are very few examples (except the var. ? mentioned below) in which the blotches forming the curve on the hinder part of the elytra are not traceable. The convexity of that curve being directed *forward* is a good superficial distinction of this species from several which somewhat resemble it. In some examples there is a dark submarginal blotch on either side of the prothorax. The size is long. 2-2½ lines.

Var. ? *erubescens*. Tota testacea (elytris nonnihil rufescentibus et antennis apicem versus picescentibus exceptis). This insect is larger than the type—very few examples being less than 2½ lines long, whereas few of the type attain that size—and the males are certainly somewhat wider than the males with dark markings on the elytra; some specimens have white lines on the elytra, which are straighter and more continuous than those on the elytra of the other form; nevertheless I think it is only a variety.

P. TRANSVERSO-MACULATA, Clk.

I have not seen an authentic type of this species, but nevertheless have little or no doubt of the correctness of my identification, as the insect is one with well-marked superficial characters. It and the next species are closely allied and are readily distinguished from their immediate allies by the feebleness of the

prosternal structure, the middle part of the prosternum being devoid of both sulcus and carinæ except in occasional examples which have the sculpture faintly indicated in the hinder part. This insect is also notable for the punctures of its elytral series being placed further apart one from another than they are in allied species. It is of comparatively depressed form and of very pale (almost whitish) testaceous colour. In a well-marked example the apical part of the antennæ, the back of the head, two spots on the prothorax, the seriate punctures of the elytra, the humeral calli and some blotches on the elytral interstices, are black. The blotches on the interstices are arranged in such fashion as to fall into three curved lines (with their convexity hindward), one about the middle, the second half-way between the middle and the apex, the third subapical. In many examples some or all of these markings are wanting. The antennæ are comparatively short and stout. The size is long. $2\frac{2}{5}$-$2\frac{4}{5}$ lines. The habitat is Western Australia. From the peculiar *whitish* colour of the elytra of dried specimens, I conjecture that living ones are of a more or less silvery colour.

P. SUBFASCIATA, Chp.

This species, with its var. (?) *planior* and the insect that I believe to be *P. notatipennis*, Chp., are extremely closely allied forms which I hesitate to regard as of specific value; indeed, I

blotches fall into lines transversely in two rows (one at, the other a little behind the middle of the elytra), neither of the rows extending further than about half-way from the suture to the lateral margin, the front row slightly (the hinder one more strongly) curved, the convexity of the curve directed hindward. There is also a small blotch near the lateral margin in line with the hinder row of blotches. Occasionally some of the blotches are wanting, and I have one example in which the hinder row is prolonged on each elytron nearly to the margin. The antennæ are somewhat short and not particularly robust. The prothorax is closely but not strongly punctulate, the lateral punctures however rather coarse. The elytra are not (or scarcely) striate, with the 10 series well marked but not at all coarse, their punctures closely placed. The prosternum is on its middle line sulcate and bicarinate only in the hinder half, and there at most feebly. The basal joint of the anterior 4 tarsi of the male is only feebly dilated. The size is long. 2-2½ lines; the habitat S. Australia.

Var. (?) *planior*. A *P. subfasciata*, Chp. ,differt forma (præsertim feminæ) perspicue magis depressa.

I regard this insect as the Tasmanian race of *subfasciata*. I can specify no distinction between it and S. Australian examples, except in its very evidently more depressed form and a tendency to infuscation about the humeral callus, this latter character indicating an approach to the Sydney insect which I take to be *notatipennis*, Chp.

P. NOTATIPENNIS, Chp.

If I were sure that the Sydney specimens which I regard as representing this species are correctly identified I should have no hesitation whatever in sinking the name as a synonym of *subfasciata*, Chp. In the absence of certainty on the point, I can only say that there is nothing in the description of *notatipennis* (apart from the markings) definitely incompatible with the description of *subfasciata* unless it be that the prothorax of the former is called "foveolate at the sides," whereas nothing is said about the sculpture—whether foveolate, impressed, or even—of

that part in the latter. The expression just quoted is not, I think, incompatible with a place in this subgroup (vide *supra*, p. 222) and probably indicates the presence of a depression (which is more or less distinctly traceable in most of the examples that I have seen of both the forms I am discussing) on the marginal region of the prothorax on either side, which, however, is of quite different character from the prothoracic foveæ of the 1st subgroup. In the Sydney specimens the humeral callus tends to be infuscate or black and there is a tendency to the line between the humeral callus and the median transverse row of blotches being occupied with a few dark marks, so as to present the appearance described by Dr. Chapuis of the front markings of the elytra being in the form of a semicircle with its extremities on the shoulders. But this difference in markings is most unreliable, and among my specimens from the Sydney district are some with scarcely any indication at all of markings on the elytra and one (which I am convinced is but an extreme var. of the same species) with a blackish line running the whole length of each elytral series, the suture widely black near the apex and the interstitial dark blotches so curiously coalescing in certain places that it is only on careful consideration one can see them to be mere developments of those forming the typical pattern of *subfasciata* rather than *notatipennis*.

P. COARCTATA, Chp.

P. POSTICALIS, Blackb.

With this species commences what I regard as the second of two aggregates into which I regard this subgroup as naturally divisible, although the exigencies of tabulation have not enabled me to treat them as primary divisions. The species of the subgroup now remaining to be dealt with are all of small size and are distinguished by the great width of their head and the shortness of the basal joint of their antennæ, which is more or less depressed and of piriform or subtriangular form (sometimes more or less claviform) and with its greatest width not (or not much) less than its length, its apex with a more or less marked tendency to be obliquely truncate. The objection to making these characters primary ones in a tabulation lies in the fact that they are found to a certain extent in a few of the comparatively large species (e.g., *Hova* and *suturalis*) in the earlier part of the subgroup. The species having these characters of the head and antennæ are easily subdivided again into two aggregates, in the former of which the prosternum is normal and the 6th joint of the antennæ (or even the 5th) is the 1st of the compressed and dilated joints, while in the latter the middle part of the prosternum is continuously convex with the lateral carinæ more or less obsolete and never elevated to the level of the actual middle line, and the 7th joint of the antennæ is the 1st of the dilated joints. The former of the two aggregates just mentioned (i.e., that with the prosternum normal) is again divisible into two sections, in the former of which the punctures of the elytral interstices are of equal size (or nearly so), while in the latter these punctures are of very unequal size (especially in the lateral interstices), there being on, at any rate, some of them a row of punctures in single file much larger than the ordinary interstitial punctures, in some species as large as the seriate punctures.

The present species then commences the 1st of the three aggregates indicated in the above remarks, distinguished from the species preceding it by the absence of the strongly marked characters (indicated in the tabulation) and of the comparatively

large size of those at the beginning of the subgroup, and by the wide head and short basal joint of the antennæ of its species from the rest; and distinguished from the aggregates that follow it by its prosternum and antennæ being of normal structure in combination with interstices of the elytral series devoid of rows of punctures conspicuously larger than the general interstitial puncturation.

P. posticalis (described by me in the Report of the Horn Expedition to Central Australia, II. p. 306) is a species of somewhat narrowly oval form and entirely (except a slight infuscation of the antennæ towards the apex, and a transverse blackish subapical elytral marking) testaceous colour. The species is distinguished from its immediate allies by the fineness of its elytral seriate puncturation, which is not much less fine than that of the interstices. Its size is long. $2\frac{1}{5}$ lines.

P. SUBSTRIATA, Chp

This is a very wide subcircular and somewhat strongly convex species. It is entirely of a brown or testaceous colour, excepting that the seriate punctures of the elytra are usually blackish and the apical part of the antennæ is infuscate. Living specimens are more or less greenish. The elytral seriate puncturation is much coarser than that of *P. posticalis*, and the interstices between the series are notably wider and flatter, especially in

2½ ad 1 latiori, fere æquali, crebrius minus subtiliter (latera versus sat grosse) punctulato, lateribus leviter arcuatis, angulis anticis acutis posticis subrotundatis; elytris haud striatis, 10-seriatim sat fortiter punctulatis, puncturis in seriebus minus symmetrice dispositis, interstitiis planis subtiliter punctulatis, sutura postice carinata, parte marginali quam series externæ haud magis fortiter punctulata.

♂. Tarsorum anteriorum 4 articulo basali sat dilatato, lateribus sat rotundatis. Long. 1⅘, lat. 1⅔ lines.

♀. Latet.

The insect for which I propose this name is not unlike *P. pulverulenta*, but without dark markings on its elytra; also it is evidently less convex, with notably shorter antennæ (some of the joints of which are scarcely longer than wide); the basal joint of the antennæ is much shorter than in *pulverulenta*. The basal joint of the anterior tarsi of the male is considerably more dilated than in *P. substriata*, Chp., and the seriate punctures of the elytra run evidently less symmetrically than in that species, a good many of them being more or less out of line with the rest. I have seen only a single specimen.

Victoria.

P. AMABILIS, Chp.

This little species (long. 1½-1¾ lines) is notable among its immediate allies for the granulation of its eyes, which is (not coarser but) more asperate, the individual facets being less flat. Its colour is uniformly testaceous or pale brown except the apical part of the antennæ, which is infuscate, and some small infuscate blotches on the elytral interstices which fall into two transverse lines, one subbasal, the other postmedian. The antennæ are like those of *P. Clio*. I have not a specimen named by Dr. Chapuis, but feel no doubt of the correctness of my identification. The species is found in Queensland and Northern N.S. Wales.

P. DAPHNE, sp.nov.

Ovalis; minus convexa; minus nitida; testacea, antennis apicem versus vix infuscatis, elytrorum sutura prope apicem sat late

sanguinea vel fusca; capite crebre minus subtiliter punctulato; antennarum articulo basali brevi; prothorace quam longiori duplo latiori, fere æquali, crebre subtilius (ad latera sat grosse) punctulato, lateribus parum arcuatis, angulis anticis obtusis parum prominulis posticis subrectis; elytris antice vix (postice sat perspicue) striatis, 10-seriatim subfortiter punctulatis, serie 7ª basin cis callum humeralem attingenti, interstitiis sat planis (ad apicem versus manifeste convexis) sat crebre minus subtiliter punctulatis, sutura postice carinata, parte marginali quam series externæ multo minus fortiter (puncturis perpaucis magnis exceptis) punctulata.

♂. Tarsorum anteriorum 4 articulo basali sat fortiter dilatato, lateribus sat rotundatis. Long. 2-2½, lat. $1\frac{3}{10}$ lines.

This is a very isolated and easily recognisable species on account of the peculiar arrangement of the seriate punctures of its elytra, the 7th series running distinctly to the base on the inner slope of the very feeble humeral callus, whereas in almost all the other species of the group the 7th series stops *immediately behind* the middle of the humeral callus. In *anxia*, Chp., and *nigroconspersa*, Clk., the 7th series runs much as it does in the present species, but is not so distinctly continuous *quite* to the base.

W. Australia; sent by Mr. Meyrick from Champion Bay, and subsequently by Mr. Lea.

on the lateral interstices) among the finer ones, but they are very much less numerous than in the following species and are not distinctly seriate in arrangement. There is no difficulty, however, in identifying the insect by its colour and markings, which are very constant in a long series of specimens that I have examined It is a species of pale or whitish-testaceous colour, with two black spots at the back of the head (variable in size), a very conspicuous black spot near the apex of each elytron, the antennæ more or less infuscate or blackish and usually some black markings on the under surface. The antennæ are moderately elongate, with all their joints distinctly longer than wide; the head is very wide and short; the basal joint of the anterior four tarsi of the male is only feebly dilated. The size is long. $1\frac{1}{3}$-$2\frac{1}{3}$ lines. The habitat is W. Australia, where it seems to be common.

P. Arethusa, sp nov.

Ovalis; sat convexa; nitida; rufo-testacea, capite prothoracis macula magna antica elytrorumque notulis magnis (sc. fascia communi basali lata retrorsum trifida, fascia lata mediana retrorsum valde arcuata, apice, et sutura, hac pone medium valde dilatata) nigris, antennis infuscatis, pedibus infuscatis (nonnullorum exemplorum nigris); capite minus crebre minus subtiliter punctulato; antennis minus elongatis, articulo basali brevi, articulis externis modice depresso-dilatatis (7^{i} 8^{o}que latitudine longitudini sat æquali); prothorace quam longiori ut $2\frac{1}{3}$ ad 1 latiori, æquali, sparsim subtiliter (latera versus subgrosse) punctulato, lateribus parum arcuatis, angulis anticis rotundatis posticis fere rectis; elytris haud striatis, distincte minus fortiter 10-striatis, interstitiis planis subtiliter valde symmetrice seriatim punctulatis, sutura postice manifeste carinata, parte marginali quam series externæ vix magis fortiter punctulata.

♂. Tarsorum anteriorum 4 articulo basali parum dilatato. Long. $1\frac{1}{4}$, lat. $1\frac{1}{3}$ lines.

A very easily recognised species superficially by its colouring (which is constant in the four examples I have seen), notably the

large black spot with its front on the front margin of the proth orax and extending back half way to the base, but not reaching the lateral margins; also remarkable for the very regular seriate arrangement of the punctures on the interstices of the elytra, which moreover are less intermingled with confused (still finer) puncturation than in the following species.

W. Australia; taken by Mr. Lea near Geraldton.

P. LEPIDA, Er. (*tritæniata*, Stäl, *fraterna*, Chp. ?).

I have not seen a Tasmanian example of this species; but I have a specimen from S. Australia and another from Victoria which agree perfectly with the author's description. It is of somewhat widely oval form and rather strongly convex, the colour testaceous (probably greenish in living specimens) with the external part of the antennæ, a bifid mark on the hind part of the head, the suture (widely), an interrupted discal vitta on each elytron, and a vitta on each side of the abdomen, black or blackish. The discal puncturation of the prothorax is fine and not very close. The basal joint of the four anterior tarsi of the male is comparatively strongly dilated (evidently more strongly than in *P. subapicalis*). Other characters are indicated in the tabulation. The size is long. $1\frac{4}{5}$-$2\frac{1}{5}$ lines; the habitat South-Eastern Australia and Tasmania. In my experience it is a rare insect.

absence of dark markings on the disc of the elytra, in joints 5-10 of the antennæ being (not entirely blackish but) testaceous at the base and on the side, in the abdomen being unicolorous, and in the dilated tarsal joint of the male being narrower. Typical specimens differ from *lepida* also in having the sutural vitta (not black but) pale red and the head unicolorous.

Var. ? *scaphoides*. I take this to be the insect referred to by Clark as bearing the MS. name *scaphoides*, Baly. It differs from the type in the hind part of the head being black, the sutural vitta being (either entirely or on its lateral margin) black, and the seriate punctures of the elytra being infuscate. The size is long. 2 lines. The species is found in W. Australia.

P. MODESTA, Chp.

Rather widely oval and rather strongly convex. Very nitid. Entirely testaceous except all the margins of the prothorax and elytra which are very narrowly of dark colour and the seriate punctures of the elytra which (at any rate in some specimens) are infuscate. The antennæ are infuscate only on a comparatively small part of each joint. The discal puncturation of the prothorax is very evidently stronger than in *lepida*, Er., and the seriate punctures of the elytra are somewhat irregular, especially in the apical ⅓ part, where some of the punctures are a little out of line with the rest and the series are not evenly spaced one from another, making some of the interstices wider than others and some wider in one part than in another part. I have an example named by Dr. Chapuis. The size is long. 1½-1⅔ lines. Occurs in W. Australia.

P. FESTIVA, Chp.

This species and the next are readily distinguished from the preceding 5 and the following 2 by the structure of their antennæ, the apical 5 or 6 joints of which are strongly dilated, some of them being actually wider than long. The present insect is extremely variable in respect of markings. In a typical example (which seems to be a rare form) the head is black, the prothorax red, the elytra red [with the suture (dilated around the scutellum and

abbreviated behind) and a discal vitta (strongly emarginate in the middle and running from the humeral callus to the apex of the dark colouring of the suture which it joins), black], and the underside (except the margins of the abdomen), the antennæ (except joints 2-4), and the legs (except the tarsi and apical part of the tibiæ) black. In most specimens, however, some or all of the following variations are found, viz., the head more or less red, the sutural vitta strongly dilated about its middle, the middle (emarginate) part of the discal vitta wanting on the elytra (so that the vitta is widely interrupted), an additional black blotch near the middle of the lateral margin of the elytra, the under-surface and legs more or less red. The form is only moderately convex; the elytra are non-striate with the 10 series of punctures very well defined but not at all coarse, the interstices finely punctured and having a good many punctures much larger (and running in rows) than the fine ones. The basal joint of the anterior 4 tarsi of the male is only moderately dilated. The species occurs in N.S. Wales, Victoria, and S. Australia. Its size is long. 1¾-2 lines.

P. JUCUNDA, Chp.

A widely oval, but not strongly convex species. Its colour is testaceous, with the following marks black or blackish, viz.:—the head; on the elytra a scutellar spot (and in some examples the

to a casual glance confused, and the 10 series by no means conspicuous. This species occurs in W. Australia, and is a trifle larger than its immediate allies, its size being long. 2-2⅓ lines. I have an example named by Dr. Chapuis.

Mr. Masters has sent me for inspection a specimen taken in N.S. Wales which looks as if it might be a variety of *P. jucunda* with the dark colouring of the elytra very much reduced in area; but, taking into account its habitat, I think it probable that the examination of more examples might lead to its being established as a distinct species.

P. SCUTIFERA, White (*sanguineotincta*, Clk., *P. amœnula*, Chp.)

One of the prettiest species in the genus. It is of testaceous colour, the head (usually red) black at the base, the suture widely red (this red stripe more or less marked with deep black and ceasing abruptly considerably before the apex). On the disc of each elytron is a bright red vitta (abbreviated at both ends) which is bordered on all its margins except the inner one by a deep black edging, the black in some examples invading almost the whole of the red colour. In some examples a red facia connects the red discal vitta of either elytron with its fellow of the other elytron. Each joint of the antennæ is more or less marked with black, and in most examples there are some infuscate or blackish markings on the under surface.

The form is strongly convex, the head and prothorax are closely and comparatively strongly punctured, and on the discal part of the elytra the punctures of the series and of the interstices are so similar in size and arrangement as to be almost indistinguishable from each other. The size is long. 1½-2 lines. The habitat is W. Australia.

P. MEDEA, sp.nov.

Late ovalis; minus convexa; nitida; testacea, antennis leviter infuscatis, elytris apicem versus indeterminate leviter infuscatis; capite crebre subfortiter punctulato, antennis modice elongatis, articulis nullis quam longioribus latioribus; prothorace quam longiori ut 2½ ad 1 latiori, crebre subfortiter

(latera versus sat grosse) punctulato, lateribus leviter arcuatis, angulis anticis obtusis posticis subrectis; elytris haud striatis, 10-seriatim sat fortiter punctulatis, interstitiis planis dupliciter (subtiliter et sat fortiter) punctulatis, interstitiorum puncturis multis serierum similibus sicut series minus perspicuæ apparent, sutura postice manifeste carinata; parte marginali quam series externæ magis grosse punctulata.

♂. Tarsorum anteriorum 4 articulo basali minus fortiter dilatato. Long. 2, lat. $1\frac{2}{3}$ lines.

This species is more depressed than most of its allies. Dried examples are entirely testaceous except the head, which is reddish (in the only two examples I have seen the head is deeply sunk in the prothorax, so that I am uncertain whether its hinder part is darkly coloured), a small part of each antennal joint which is infuscate, an ill-defined and faint infuscation near the apex of each elytron, and the lateral sutures of the metasternum which are infuscate. The suture of the elytra is absolutely concolorous with the general surface. The best specific distinction lies in the elytral puncturation which differs from that of *subapicalis* in the presence of numerous interstitial punctures much larger than the prevailing small ones, and from *Arethusa*, *lepida*, *mediovittata*, *modesta* and *festiva*, by many of the interstitial punctures being sufficiently like the seriate punctures to cause the series (especially the discal ones) to appear somewhat indistinct and confused among the interstitial punctures. From *iucunda* and *scutifera*

distinguished (among those of very small size, and having the basal joint of the antennæ very short) by their prosternum not longitudinally sulcate nor bicarinate down the middle, and (in the case of nearly all the species) by joints 7-11 of the antennæ being triangularly dilated in conspicuous contrast to the preceding joints which (except the 1st) are cylindric. The present species and the next are distinguishable from those following them by (*inter alia*) the larger size of the seriate punctures of their elytra, which become in the lateral series quite coarse.

P. apicata is of oval form and very feeble convexity, with the sutural apical angle of its elytra very sharp and the extreme apex of the elytra somewhat explanate, so that it approximates in form to *P. Hera* and its allies, but its much smaller size and different antennal structure *inter alia* prevent any difficulty in separating it from them. It is of testaceous colour, the head usually reddish, and the prothorax and elytra in some examples vaguely mottled with faint infuscation, which about the base and apex of the elytra is more distinct than elsewhere, and in frequent specimens is of a reddish or even bright rosy colour. On the under-surface the abdomen is considerably mottled with fuscous. The antennæ are scarcely infuscate. The elytra are scarcely striate in the male, distinctly so in the female. The seriate punctures are moderately fine near the suture, but become quite coarse near the lateral margins, and the interstices are rather strongly punctured. The basal joint of the anterior 4 tarsi of the male is moderately strongly dilated—considerably more strongly than in *subapicalis*, Chp.— with evidently rounded sides. The size is long. $1\frac{4}{5}$-$2\frac{1}{3}$ lines. The habitat is W. Australia. I have examples before me (in which the elytral markings are entirely fuscous, without any reddish colouring) which agree very well with the description of *P. naricula*, Chp. I have also an example in which the whole elytra are suffused with red.

P. DELICATULA, Chp.

This species bears a remarkable superficial likeness to *P. Hamadryas*, Stäl (in Subgroup vi), but is widely separated from it by

the entirely different form of its head. It is of testaceous-brown colour except some variable (but fairly well defined) fuscous blotches on the interstices of the elytra, which are so placed as to form more or less distinctly 4 transverse fasciæ, which are more or less connected by longitudinal fuscous colouring along the suture, and a little within the lateral margin, none of the fuscous colouring reaching to the actual marginal portion of the elytra. The antennæ are slightly infuscate, and are not of the structure prevalent among the immediately allied species, the dilatation of the joints commencing (feebly, but distinctly) at the 4th joint. The prosternal structure is as in *P. apicata*. The basal joint of the anterior 4 tarsi of the male is distinctly less dilated than in *apicata*, and has less rounded sides. I have the insect from Victoria; its author quotes Tasmania and S. Australia as its habitat. It is of very small size (long $1\frac{1}{3}$-$1\frac{1}{2}$ lines.) One of my specimens was named by Dr. Chapuis.

P. NIOBE, sp.nov.

Ovalis; subelongata; minus convexa; sat (mas) vel minus (femina) nitida; testacea vel viridi-testacea, antennis apicem versus infuscatis vel nigricantibus; capite subgrosse subcrebre nec profunde punctulato; antennis minus brevibus, articulis 1° brevi 2-6 cylindricis 7° apicem versus leviter incrassato-depresso quam 8^us^ haud breviori, 8-10 manifeste nec abrupte

♀. Elytrorum interstitiis coriaceis opacis vix manifeste punctulatis, postice vix vel manifeste convexis.

Var. elytrorum sutura antice late nigro-marginata, metasterno infuscato. Long. $1\frac{1}{2}$-$1\frac{4}{5}$, lat. $\frac{4}{5}$-1 lines.

This species is very easily recognisable, the male by the very widely dilated basal joint of its anterior tarsi (which is very much more widely dilated than in any allied species known to me), the female by the interstices of its elytra being opaquely coriaceous but without distinct puncturation. I have no hesitation in regarding these two forms as the sexes of one species, although I have not seen the insect alive. I have received it (from Geraldton, W. Australia) from Messrs. Meyrick and Lea, the latter of whom sent examples of both sexes gummed on one card, indicating thereby, I presume, that they were taken in company.

P. NIGRITULA, Clk.

I have before me two specimens taken at Geraldton (the original locality) which agree with the description of this species in all respects except in having the external margin of their elytra (in one very narrowly, in the other widely) testaceous. It is certainly, I think, a variety of a species of which I have other examples from Geraldton, and which is ordinarily entirely testaceous in colour. Among the species of this aggregate (beginning in the foregoing tabulation with *apicata*, Clk.) it is recognisable by the following characters in combination, viz., seriate punctures of elytra comparatively fine, tarsal characters of the male feeble, elytral interstices of female nitid and distinctly punctured, form depressed and widely oval (but by no means circular), head somewhat wide and flat but not coarsely or deeply punctured. Its antennæ are very short (notably shorter than those of *P. Niobe*) with their 7th joint so slightly dilated in comparison of the 8th that the apical four joints seemed to form a distinct club and are scarcely at all infuscate towards their apex. Its size is long. $1\frac{1}{2}$-$1\frac{3}{5}$ lines.

N B.—The specimens of this insect which I regard as males have their tarsal characters so extremely feeble that I am not

entirely without doubt as to their sex. If it should prove that I have not seen the male (and that the sexual characters in the tarsi are not strongly different from those of *P. Niobe*) the male of this species would no doubt be found to differ from that of *Niobe* by its wider form and shorter less infuscate antennæ with apical four joints more abruptly dilated as compared with the preceding joints.

P. CHLOROTICA, Oliv. (? *viridula*, Chp.)

There seems to be no particular reason for objecting to this identification, although Olivier's description is insufficient to warrant any great confidence in it, and it is quite possible that (if the type can be examined) it may need correction. The insect to which I attribute this name is a small species (long. $1\frac{1}{2}$-$1\frac{3}{5}$ lines) notable among its immediate allies for its decidedly convex form; looked at from the side, the upper outline of its elytra forms a continuous well-marked curve (in *P. Niobe*, *nigritula*, &c., that outline is nearly straight for a considerable portion of its length). It is also notable for its very wide flat head, the puncturation of which is exceptionally coarse, deep and sparse. Its shape is widely oval (much as in *P. nigritula*, Clk.), but by no means circular. There are few more variable *Paropses* in respect of colour and markings (unless I am confusing several very closely allied species). The specimens before me vary from entirely testaceous

P. ŒNONE, sp.nov.

Ovalis; subelongata; minus convexa; sat nitida; testacea vel viridi-testacea, elytris basin versus plus minusve perspicue fusco- vel rufo-adumbratis; capite inter oculos sat convexo, leviter sparsius punctulato; antennis brevibus, articulis 1° brevibus 2-6 cylindricis 7-11 sat dilatatis submoniliformibus; prothorace quam longiori ut 2½ ad 1 latiori, fere æquali, in disco vix perspicue ad latera subfortiter punctulato, lateribus parum arcuatis, angulis anticis subacutis posticis subrectis; elytris antice haud (postice sat manifeste) striatis, distincte subtilius 10-seriatim punctulatis, interstitiis subtiliter sat crebre nec seriatim punctulatis, sutura postice manifeste carinata, parte marginali quam series externæ vix magis fortiter punctulata; prosterni parte mediana haud sulcata, ad latera leviter subtiliter carinata. Long. 1-1⅛, lat. ⅜ lines.

I do not think that I have seen a male of this species, but it is difficult to determine the sex of these extremely small *Paropsis* unless the characters happen to be strongly developed. *P. Œnone*, however, is easily distinguished by the characters cited in the tabulation. It is especially notable among its immediate allies for its more convex head and very short antennæ. In shape it resembles *P. Niobe*, but is not quite so depressed as that species.

Central Australia.

P. IRENE, sp.nov.

Latissime ovalis, fere circularis, postice angustata; minus convexa; sat nitida; testacea vel viridi-testacea, elytris (nonnullorum exemplorum) latera apicemque versus indeterminate infuscatis, antennis apicem versus infuscatis; capite inter oculos minus plano subfortiter minus crebre punctulato; antennis sat brevibus, articulis 1° brevi, 2-6 cylindricis, 7° parum dilatato, 8-11 sat dilatatis; prothorace quam longiori ut 2½ ad 1 latiori, latera versus manifeste impresso, in disco subtiliter latera versus sat fortiter crebrius punctulato, lateribus leviter arcuatis, angulis anticis obtusis posticis subrectis;

elytris antice haud (postice vix) striatis, distincte subtiliter 10-seriatim punctulatis, interstitiis perspicue minus crebre nec seriatim punctulatis, sutura postice manifeste carinata, parte marginali quam series externæ vix magis fortiter punctulata; prosterni parte mediana haud sulcata utrinque obsolete carinata.

♂. Tarsorum anteriorum 4 articulo basali elongato minus fortiter dilatato. Long. 1-1$\frac{1}{5}$, lat. $\frac{4}{5}$ lines.

Easily recognisable among its immediate allies by its very widely oval form, which would be circular were it not that the elytra are somewhat drawn out and acuminate at the apex. The antennæ are conspicuously shorter than those of *P. Niobe* but not so short as those of *P. Œnone*. The form is considerably wider and much more depressed than in *P. chlorotica*, Boisd., and the head is conspicuously narrower and less flattened between the eyes than in *P. nigritula*, Clk.

S. Australia; Eyre's Peninsula.

FURTHER CARVED BOOMERANGS, AND TWO VARIETIES OF THE LANGEEL FROM NORTH QUEENSLAND.

By R. Etheridge, Junr., Curator of the Australian Museum, Sydney.

(Plates xx.-xxi.)

I am again indebted to Mr. J. A. Boyd, of Ripple Creek, near Ingham, N.Q., for an opportunity of describing two further incised boomerangs, and two varieties of the *Langeel*, one resembling the *Marpangye* and the other the *Bendi*.

Both boomerangs are small weapons, much smaller than the generality of those with incised surfaces, being only twenty-one and a half inches across the curve. They are slightly convex on the obverse as usual and comparatively flat on the reverse, one somewhat more so than the other. The apices of one are sub-mucronate, those of the other obtusely pointed. The former weapon is almost smooth on the reverse, the latter finely grooved or tooled like so many of the better finished and older Aboriginal weapons.

The boomerang with the sub-mucronate apices (fig. 1) is nearly of the same type as one of those formerly sent to me by Mr. Boyd,* except that it is devoid of the representation of any natural object. As in the figure quoted, the median line of the obverse is occupied by a succession of conjoined ovals, or "sausage"-like figures, with the convex and concave margins scalloped, but this marginal sculpture in the present instance is

* Proc. Linn. Soc. N.S. Wales, 1897, Pt. 2, t. ii. f. 2.

very much shallower. Like the former and generally similar boomerang from Mr. Boyd, it is a modification of section (*g*) in my classification of this weapon.* The sub-mucronate apices are divided off from the remainder of the surface by cross-bars. The incisions in the central line of ovals are longitudinal, those of the marginal festoons are either slightly oblique to the longer axis of the weapon or angled to follow the outline of each festoon.

The second boomerang (fig. 2) is of the same type, in so far that the incised figures consist of lenticular ovals, two series, one on each flank of the convex surface, with marginal scalloping, the intermediate portion of the surface carrying ordinary St. Andrew's crosses. There are no cross-bars at the apices, but there is a broad transverse median band, with both longitudinal, longitudinal-oblique and transverse-oblique grooving, the last occupying a central and limited area on the band. The grooving of the two central rows of ovals is longitudinal, but that of the lateral festoons is oblique.

In his recently published work,† Dr. W. E. Roth has afforded an explanation of many of the figures found on carved boomerangs. The following facts are taken from this most excellent work :— The marginal festoons or scallopings are found only on weapons made in and to the south of the Boulia District, West Central Queensland. The lenticular or shuttle-shaped figures, when filled with more or less longitudinal lines are called by some of the

the breadth of the boomerangs, whether at the apices or in the middle, are known in the Boulia District as "handle-marks" *(tin-ja ming-ka-ra)*. A description of the interstitial figures occurring on these boomerangs is also given, but those only that need be referred to here are the crosses on fig. 1. Similar crosses in the Boulia District are called "cross-cuts" *(wer-koo)*, and are identical with those on the thighs of near male relatives in times of mourning.

In both the boomerangs now figured, applying Dr. Roth's facts, we observe the central portions occupied by the "mountain-top" or "fishing-net marks." One only (fig. 1) bears "handle-marks," whilst the other (fig. 2) exhibits "cross-cuts."

The other weapons sent me by Mr. Boyd are allied to a series I figured in the "Internationales Archiv für Ethnographie,"* and variously known under the names of *Langeel*, *Marpangye*, *Burroong*, *Coopin*, or *Bendi*, according to the form and locality of the weapon, and in my opinion all derived from one and the same original conception. The type is distributed in one or another of these forms from the south-east districts of South Australia, through Victoria, Eastern N.S. Wales as far north as the Tweed and Nambucra Rivers, and then again crops up in the Herbert River District, Queensland, where it was met with under the name of *Bendi* by the Swedish traveller Lumholtz.

The interesting point, however, in connection with these weapons is that one is like the *Bendi* of Lumholtz, and the other unlike the latter, or any of the intermediate forms, but agrees with the *Marpangye* of Encounter Bay, S.A.

Lumholtz's *Bendi* consists of a very long handle, with the head, or blade, comparatively flat, sharp along the margins, and curving gracefully outwards and upwards to an obtuse point, without any marked degree of enlargement.† The *Marpangye*, on the contrary, is a much rougher and more formidable looking weapon, and consists of a long straight handle with a short, stout, expanded, emu-head shaped blade, inclined slightly downwards to

* Bd. x. 1897. pl. 3.

† Among Cannibals, 1890, p. 234, figs.

the handle, or nearly at right angles to the latter. To find the same form of a highly specialised weapon at two such extreme points as Encounter Bay in South Australia and Ripple Creek in North Queensland is, to say the least, a very interesting point in the distribution of Aboriginal weapons.

The larger and *Marpangye*-like form sent by Mr. Boyd (fig. 3) is two feet five inches long, of which two feet form what may be termed the handle, and is slightly curved. A root seems to have been taken advantage of, both in this instance and in that of the South Australian weapons. Beyond a thinning down of the head it does not seem to have been fabricated in any way, but retains its original rough outline. From the handle, or shaft, the head expands a little and curves over and downwards, with a fanciful resemblance to a bird's head and beak; the handle is ruddled and the head covered with pipeclay. It bears the closest possible resemblance to the *Marpangye* from Encounter Bay, figured by Eyre.*

The second or *Bendi* type of weapon (fig. 4) is two inches shorter in the handle than the preceding, with a less expanded head, that instead of curving downwards is gently inclined forwards and upwards, terminating in a much sharper point; the handle is ruddled but the head is left uncoloured. In shape it approximates nearest to one of Lumholtz's figures previously quoted.† In the case of both weapons the proximal ends are

A CONTRIBUTION TO THE DEVELOPMENT OF THE COMMON PHALANGER.

By R. Broom, M.D., B.Sc.

(Plates xxii.-xxv.)

It seems at first sight somewhat surprising that so little work has been done towards the developmental history of Marsupials, considering the important position occupied by this group, and the number of points on which light might be thrown on the structure and development of the higher mammals. But doubtless one of the chief reasons is that marsupials only breed once or at most, I believe, twice a year, and that the periods of gestation are so short that it is exceedingly difficult for even those on the spot to obtain a good collection of intra-uterine stages. As this difficulty will always exist and the chances are rather against any one collector obtaining a large series of intra-uterine stages of certain forms, it seems advisable that those who are in a position should fill up what gaps they can rather than wait till some one is able to give an exhaustive treatise.

The difficulties in the way of collecting a series of early stages are not so very great in the case of one or two of the larger forms, but in many others they are considerable, and this is the case with the common Phalanger; so that, though it is one of the commonest of marsupials, scarcely anything has been published on its development. Selenka* in 1891 gave an account of some early stages of the ovum, and in 1897 Beard† published an account of two of my embryos—one shortly before birth and the other just

* Selenka, E., Studien zur Entwickl. der Thiere, Hft. 5.

† Beard, J., "The Birth-period of *Trichosurus vulpecula*," Zool. Jahrb. 1897.

born; with the exception, however, of these two papers and of one or two dealing with some special point in the anatomy* I am not aware of anything else having been published on the development of this form. Nor indeed has there apparently been any account published of the development of the intra-uterine embryo in any diprotodont marsupial.

From the autumn, 1894, till May, 1896, I was engaged in the practice of my profession at Taralga, N.S.W., a little township situated on the Blue Mountains about 30 miles N.W. of Goulburn. Originally the whole country round had been covered by the monotonous gum-trees, and though much of the land has now been cleared much still remains in a virgin condition, and in many parts the trees have only been thinned. These woodlands afford shelter to a variety of marsupials, of which the common Phalanger, popularly called the "'Possum" (*Trichosurus vulpecula*), is the most abundant, although some years ago the Native Bear (*Phascolarctus cinereus*) is said to have been more plentiful. Within the last two years, owing to the high price of skins, the phalangers have been shot in such numbers that I understand they have now become scarce.

The phalanger comes out of its retreat shortly after the sun is set, and may occasionally be seen running about before the daylight has quite died away; but as a rule it is only on moonlight nights that the animal is to be seen. The general opinion among

examination he probably sees the little animal sitting on one of the higher branches, from which, with a well-aimed shot, there is little difficulty usually in dislodging it. Should the animal be merely wounded, it is not improbable that it may hang suspended by its prehensile tail, and occasionally it may continue so to hang after it is quite dead, especially if it has managed to catch its tail round a small twig. Except during the pairing season the animals are usually seen singly. The ring-tailed phalangers (*Pseudochirus*) and the great flying phalangers (*Petauroides*) are, on the other hand. generally found in pairs.

About the month of March the phalanger begins to breed, though there is apparently some little difference in the exact breeding season in different years. Thus in 1896 the majority of the females had their young three or four weeks earlier than in 1895. Though there are two teats in the pouch there is almost never more than one young one at a time. My friend Mr. Walter Scott, of Golspie, who has rendered me most valuable assistance in the collection of specimens, and to whose kindness I owe most of my intra-uterine stages, though he has shot many thousands of phalangers, has only on one occasion come across a case of twins, which he kindly sent me with the pouch.

The exact period of gestation and the rate of growth of the fœtus could only be found with certainty by breeding in captivity, but by taking into consideration the average degree of development at different dates the rate of growth can be approximated. For though there are individuals which have their young some weeks later and others earlier than the rest, the large majority agree very closely in their time of breeding. Thus on 11th May, 1895, out of 12 females shot 10 had mammary fœtuses varying from 20 to 70 mm. in length, but averaging 40 mm., while two had ova in the uterus in early segmentation and primitive streak stages. By the following moon—for, of course, after a week's shooting by one moon nothing further can be done till nearly three weeks—most of the young averaged from 60-85 mm., while in the beginning of July the mammary fœtuses averaged from 100-130 mm. By August the little one is well furred and able

to leave the pouch, though for probably another month at least the little one returns to the pouch for milk; and even after the young is too large for the pouch it keeps by its mother till nearly full grown. By the following March or April the previous year's young are full grown and ready to start families of their own.

In connection with the breeding habits Mr. Scott sends me the following very interesting note, which confirms my own opinion, and to some extent explains the difficulty in obtaining intra-uterine embryos:—"Just before giving birth to their young," he says, "the female opossums are not out very much. My reason for making this assertion is this—during the moon in the beginning of April [full moon was on 6th April] when most of the females were on the point of having their young, I found very few does —nearly ¾ of those got being bucks—whilst during the moon just past [full moon 6th May] most of those shot were does, but, unfortunately, they had, with very few exceptions, already their young ones in the pouch."

As I have only a very few very early stages, and as Selenka has already described very similar ova of the Rat-Kangaroo, I shall in the present communication confine myself to descriptions of the later intra-uterine embryos, with some notes on the mammary fœtuses. As the membranes in most of the stages described have been torn and displaced, and are in only one case moderately intact, I shall not refer to these structures at present, beyond

External anatomy.—As figured the fœtus measures 8·2 mm., so that allowing for a slight crushing of the back of the head, the uninjured fœtus probably measured 8·5 mm. The most striking characteristic of the external appearance is the great proportional development of the fore-quarters; while the hind limbs are little more that buds, without any indication of digits; the fore limbs are well developed, and have digits distinctly divided from each other, though not completely. Each digit is somewhat pointed, and on section there are found to be distinct indications of the developing claws. The anterior limbs are short and stout, and, as seen from the front, are pretty widely apart, which is owing to the skeletal elements of the two sides not having yet met in front of the heart. The tail is moderately stout, and towards the tip the spinal cord is distinctly seen through the thin epidermis

Epidermis.—The epidermis, though thin, is not uniformly so. On the fore-limbs and back there is a very distinct epitrichial layer, but towards the lower part of the body and in front it is much less marked, and in some parts not very distinct. Claw rudiments are well marked at the tips of the anterior digits.

Skeleton.—The injured condition of the head makes it impossible to say much more than that the parachordal cartilages are well formed, and that there is as yet no chondrification of the auditory capsule. Sufficient of Meckel's cartilage is preserved to show that it is distinctly chondrified, although in the hyoid arch the process is just commencing. In the cervical region the vertebral centra and arches are already cartilaginous, and cartilage can be recognised in the vertebral centra down to the upper lumbar region. The upper ribs are fairly well chondrified, although no distinct sternum is as yet present. The scapula is well developed, as are also the elements of the fore limbs, but the coracoid is only distinctly formed at its outer part. In the clavicle ossification is just commencing. The skeletal elements of the pelvis and hind limbs are not yet distinctly differentiated.

Nervous system.—The central canal of the spinal cord is narrow in its anterior half, but its posterior half is on section oval or pear-shaped. The cellular elements are much more

numerous round the posterior half of the canal than in the anterior half. In the antero-lateral horn the group of neuroblasts from which the anterior roots are springing is comparatively small. Both anterior and posterior white columns are as yet small.

Heart and vessels.—The two auricles communicate freely in the upper part below the margin of the septum superius, but are divided below by the septum intermedium. The septum inferius does not reach the auriculo-ventricular ostium; the ventricles being thus in free inter-communication. The sinus venosus is comparatively small. The truncus arteriosus is undivided to the level of the upper third of the auricles. The condition of the main blood vessels I have recently elsewhere described.* It may here be briefly noted that the remains of the right aorta and of the right ductus arteriosus Botalli can still be traced, and that the right pulmonary artery comes off very distinctly from the right fifth (6th ?) arterial arch, the left pulmonary artery coming off as distinctly from the left arch. The condition of the umbilical veins is very interesting in that, though the embryo is in some

till it opens into the large intestine. There is a distinct and fairly large thimble-shaped cæcum which is continuous with a moderately wide dilatation of the large intestine about three times as long as the cæcum. From the upper end of this dilatation, however, the canal again narrows, and continues as a narrow tube to the cloaca. The liver is well developed, and already there is a distinct and well-formed gall bladder. The pancreas is fairly well developed.

Urinogenital system.—The mesonephros is of fairly large size, but the tubules and glomeruli are considerably smaller than in the Wolffian body of an embryo sheep in a somewhat similar stage of development. The peritoneal funnels of the Muellerian ducts are developed, but the ducts themselves have scarcely commenced. The germinal epithelium forms a comparatively narrow layer. The kidney and ureter are already indicated and differentiated from each other, the kidney being present as a somewhat irregular dilatation surrounded by a condensation of mesoblastic cells. The cloaca is not yet open to the exterior.

On comparing the condition of the organs in this embryo with that in the embryos of Perameles, described by Hill,* it will be seen that there is, on the whole, a very close agreement in the stage of development, between the 8·5 mm Trichosurus embryo and the 8·75 mm. embryo of *Perameles obesula*.

Embryo B (9·5 mm). Plate xxii., fig. 2.

This embryo, which has not as yet been cut, as it is practically in the same stage of development as the following one, is distinctly in advance of Embryo A. The head and fore-quarters are together considerably larger than the rest of the body. The head is much bent on the body. The mouth is widely open and the tongue protruding. The cleft of the mouth extends back to the level of the eye. The nose is well formed and bears a marked resemblance to the nose of the well-developed mammary fœtuses, and even to that of the

* J. P. Hill. "The Placentation of *Perameles*," Quart. Journ. Microsc. Sc. Vol. xl., p. 385.

adult. No trace of the lachrymal grooves can be detected externally, except, perhaps, the slight notching of the lip. The eyelids give the eye an oval shape, and the slight pigmentation of the retina can be seen. The external ear is already well developed, and a distinct little pointed pinna stands up from the upper and posterior part of the meatus. The anterior limbs are considerably further developed than in Embryo A, and the digits almost meet in front of the chest. Distinct little claws can be detected on the digits. The hind limbs are much in advance of those in Embryo A, and indications of the separate digits can be distinctly made out.

Embryo C (10 mm). Plate xxii., fig. 3.

This embryo very closely resembles the preceding. The head is here even more bent on the body. The mouth is almost closed, and the tip of the tongue only but very slightly protruded. The nose and eye are very similar to those in Embryo B, but the ear is apparently a little better developed. The fore limbs are, perhaps, very slightly better developed; but in the hind limbs,

resting on the base of the nasal septum. Towards the posterior of the palate plates the palato-pterygoid bar can be detected as a narrow semi-cartilaginous rod. Meckel's cartilage is very well developed, and the hyoid arch fairly well, as is also the thyroid. The vertebral centra and arches are more or less chondrified almost to the root of the tail. The ribs are also developed, with the sternum, of which latter, however, the two halves are still considerably apart. The scapula is well chondrified, and the coracoid partly. The clavicle is very distinctly ossified. No chondrification has as yet taken place in the pelvic arch.

Nervous system.—The brain, on the whole, agrees roughly in its degree of development with that of a sheep embryo of 15 mm., though in one or two points the development is more delayed in the marsupial. The hypophysis is quite unconnected with the oral cavity. The spinal cord closely resembles that of Embryo A, though the cellular elements, especially in the anterior half of the cord, are considerably more developed.

Sense organs.— With the exception of its communicating freely with the mouth, the nose agrees essentially with the adult condition. Jacobson's organ is already developed as a tubular epithelial diverticulum. The eye corresponds roughly in its degree of development to that of a human fœtus of five weeks (His). The optic stalk has still a faily wide lumen. The inner wall of the optic cup is fairly thick, and in the outer there is some degree of pigmentation. The lens is relatively considerably smaller than in the corresponding stage of the rabbit or sheep; and has a fairly large cavity. The condition of the internal ear agrees pretty closely with that of the human fœtus of five weeks. The cochlea is a moderately long and fairly straight tube. The saccule and utricle are still undifferentiated; while the semicircular canals are all present as independent canals. The recessus labyrinthi is present as an elongated somewhat club-shaped epithelial process. The taste buds are very distinctly seen on the tongue.

Heart and vessels.—The heart is not developed much in advance of the condition in Embryo A. The septum inferius

does not yet completely divide the ventricles. The septum intermedium, however, is distinctly more developed. The condition of the main blood vessels is very similar: the right and left umbilical veins, though now much closer together, still open independently into the liver.

Lungs.—The degree of bronchial ramification is now considerably in advance of the condition in the seven weeks' human fœtus.

Alimentary canal.—In this embryo the alimentary canal is unfortunately damaged in the region of the umbilicus, but the canal, so far as preserved, differs but little from that in Embryo A. The lumen of the œsophagus, for a considerable distance, is exceedingly small. The pancreas and liver are both fairly well developed.

Urinogenital system.—The mesonephros is considerably further developed than in Embryo A, the tubes being more convoluted, and the glomeruli very considerably larger. The epithelial process representing the pelvis of the true kidney is now markedly lobulated, and well differentiated from the ureter. The genital ridge is much more marked.

Embryo D (10·5 mm. as preserved in picro-sulphuric acid).

Plate xxii., fig. 4.

Embryo E (11 mm.).

stage of development being described from the sections of Embryo E.

External characters.—Though the head is flexed on the chest, the neck takes less part in the flexion than in the earlier stages. The cheeks and upper lips are more compressed, and the whole muzzle is more rounded than in Embryos B and C. The lips are fused to a considerable extent, so that the cleft of the mouth instead of being beneath the eye, as in Embryos B and C, is now found beneath a point half-way between the nostril and the eye. The eye is encroached on to a considerable extent by the epitrichial layer, and, though still oval in shape, appears appreciably smaller. The ear resembles the earlier condition, but, like the eye, is becoming encroached upon so that, though the pinna is still quite distinct, the hollow of the external auditory meatus is largely filled by the thickening epithelium. In the figure the fore limb appears almost shorter than in Embryo C, but this appearance is partly due to the skeletal elements meeting in front, and partly to the increased epithelial growth, as the digits could now quite easily interlock. The claws are well marked. The hind limbs are not yet much more advanced than in Embryo C, but the digits are rather more distinctly mapped out.

Epidermis.—Besides the increase of the epitrichial layer, the most noteworthy additional feature met with in this stage is the presence of well marked hair anlagen on the sides of the snout. These are present as proliferations and dippings down of the cells of the Malpighian layer, with condensations of the subjacent mesoblastic cells. The dental lamina extends round a considerable distance on both jaws, and the dental germs of the first upper incisors are well differentiated.

Skeleton.—Except in the more complete chondrification of the various elements the skeleton differs but little from that of Embryo C. The coracoid is now chondrified to its inner end. In the lower extremity the femur and pelvic elements, though not yet cartilaginous, can be distinctly traced. Ossification is just commencing in the maxillary bone.

Nervous system.—The brain and spinal cord do not differ greatly from those in Embryo C. The central canal of the cord is still of great size, and occupies $\frac{7}{9}$ of the antero-posterior diameter of the cord. It is considerably dilated at its posterior end, so that the canal on section is club-shaped. Cellular elements (presumably spongioblasts) are very abundant round the posterior part of the canal. The anterior cornu of grey matter is very much larger than the posterior.

Sense organs.—The nasal cavity is now well developed, though still communicating freely with the mouth. Jacobson's organ is likewise well formed and rests on the now chondrified paraseptal cartilage. The eye has not advanced much from the condition in embryo C. There is still a fairly wide lumen in the optic stalk, but the lumen of the lens is appreciably smaller. In the ear the saccule and utricle are now to some extent differentiated from one another. The semicircular canals are well formed.

Heart and vessels.—The division of the ventricle is not yet quite complete, but the aortic bulb is considerably further subdivided than in Embryo C. The chief blood vessels, with the exception of those belonging to the distinctively fœtal circulation, agree in the main closely with the adult condition. The right umbilical vein is still present, but it no longer opens into the liver, and merely serves to convey some of the blood from the

relatively longer than in Embryo C, is considerably narrower, as is also the upper part of the great intestine generally. The rectum is now distinctly open.

Urinogenital system.—The mesonephros is relatively very large, and the tubules very much convoluted. The Muellerian ducts are laid down for a very short distance. The germinal epithelium is well developed, but sexual differentiation is not apparent. The condition of the permanent kidney is very similar to that in Embryo C; the sprouting is, however, somewhat more marked.

EMBRYO F (14 mm). Plate XXIII., fig 5.

This embryo has already been figured by Dr. Beard in the paper above referred to, but as his illustration is not very carefully done, and contains a number of inaccuracies, I have thought it well to refigure the embryo. This and the following embryo well illustrate the degree of development just before birth. The epitrichial layer is so far developed that the eye and ear are almost completely obscured; the position of the eye, however, can be distinctly made out owing to the pigmentation still being visible through the epithelial layer. In Dr. Beard's illustration a certain obscure shading is evidently intended to represent the position of the eye, but the eye is considerably nearer the nostril than is indicated in the drawing. The lips are almost united laterally to form the "Saugmund," but not yet completely. The head is still folded slightly on the chest. The arms and hands are in much the same position as in the earlier embryos—folded across the chest. The claws are now well developed. The hind limbs are still small, though the digits are very distinctly formed and partly separated from each other. The hallux stands prominently out and about equals in size the 2nd and 3rd digits, while the 4th and 5th digits are each about one-half larger than the others. In Dr. Beard's figure the 2nd and 3rd digits are shown as fairly large, and the 4th and 5th quite rudimentary.

Epidermis.—The epitrichial layer is fairly well developed over the whole body, but is especially marked on the snout, sides of head, and fore-limbs. Hair follicles are present in those situa-

tions where enlarged hairs (? tactile hairs) are met with in the later mammary fœtuses. The dental lamina can be traced back to the plane of the eye, and the dental germs of the anterior teeth are well differentiated.

Skeleton.—The cartilaginous skeleton is almost completely formed. The pelvis and the skeleton of the posterior extremities are fairly well chondrified, and the vertebral centra can be traced for a considerable distance along the tail. The sternum is developed, but at its lower half the two sides are not yet completely united. The coracoid is well developed and articulates with the sternum, and the clavicle is well ossified. The chondrocranium is complete, and the following bones are well ossified — premaxillaries, maxillaries, palatines, and mandibles.

Nervous system.—The brain and spinal cord are not very satisfactorily preserved in this embryo. In the cord the grey columns are still further developed, giving the cord on section a more rounded appearance. The central canal still extends to the posterior part, and there is as yet no trace of a posterior fissure.

Sense organs.—The nose is well formed, and as the palate is

right vein is practically lost, though it can still be detected as an exceedingly minute vessel.

Lungs.—In the earlier embryos the bronchial tubes appear as moderately simple tubular processes, but at this stage the terminal tubules have become enlarged into irregular saccular dilatations, along the borders of which further budding is taking place into the mesoblastic tissue.

Alimentary canal.—The œsophagus is very well formed, and has a moderately wide lumen throughout its whole extent. The rest of the canal resembles closely that in Embryo E. The stomach and upper part of the small intestine are better developed, and the cæcum is larger and more dilated.

Urinogenital system.—The mesonephros is not much larger than in Embryo E, nor are the tubules more convoluted. The Muellerian ducts are, however, considerably further developed, and the permanent kidney is much advanced, the uriniferous tubules becoming distinctly developed. The genital gland is fairly large, but it has apparently not yet become sexually differentiated.

EMBRYO G (14 mm). Plate XXIII., fig. 6.

This beautifully preserved embryo, though of similar size to the preceding, and quite ready to be born, differs in one or two points. The head is lifted up from the chest and is in a similar attitude to that in the newly born embryo. Though this specimen was removed from the uterus and has the membranes still attached, it has in all probability breathed, and the tip of the tongue is hollowed, as if endeavours had been made to grasp the expected nipple. The fore limbs no longer cross in front of the chest, but hang down as if ready to catch on to the mamma. The hind limbs come well forward and are well developed, the different digits being well shown. The body is considerably larger than in Embryo F, which I think due to this embryo's having breathed. There is one interesting point about this specimen, in that the epitrichial layer has not quite completely

covered the eye—a minute slip being still left between the eyelids.

EMBRYO H (14·8 mm.). Plate XXIII., fig. 7.

This embryo is a very good example of the newly born condition. I have in my possession six embryos in which part of the umbilical cord is still attached, and all of which may be regarded as newly born. Of these the greatest lengths are 13 mm., 13·8 mm., 14·5 mm., 14·8 mm., 15·2 mm., and 15·4 mm. As these embryos have all been similarly preserved, it will be seen that there is some slight variation in the exact size at birth, but that the average size is a little over 14 mm. Even at this very early stage when the little embryo is removed from the teat it makes clawing movements with its fore limbs as if endeavouring to pull itself on to the teat again; and as a result of this the fore limbs in the preserved specimens are found in very various attitudes. The palms are usually turned more or less downwards and inwards, and the limbs project forwards. In one specimen, however, the limbs are raised, and the back of the right hand almost touches the side of the head. The claws are very sharp and fairly long. In most specimens the head is well raised—its axis being at right angles to that of the body. The epitrichial layer is so thick that the eye can only with difficulty be made out, while the ear is completely covered over and only indicated by

Epidermis.—The epitrichial layer is moderately thick all over the body; but, as in the previous embryo, the layer is thickest on the head and fore limbs. The hair follicles of the large hairs of the head and fore limbs are well formed, but there is no trace as yet of the follicles of the body hairs. The claws of the digits of the anterior limbs are well formed, but on the posterior digits, though the epithelium is thickened at the tips, there is no distinct evidence of claws. The anterior dental germs are well formed, and the dental lamina can be traced well back.

Skeleton.—The cartilaginous skeleton is almost complete. The vertebral centra are chondrified well into the tail, and in the upper vertebral region the notochord is almost obliterated except in the inter-vertebral discs. The neural arches do not yet meet, however. The upper limb is completely formed, and the coracoid well chondrified to its attachment with the sternum. The lower limb is almost completely formed, the phalanges and the tarsal elements being chondrified. The chondrocranium may be regarded as complete, and the following bones are well ossified—premaxillaries, maxillaries, palatines, pterygoids and mandibles.

Nervous system.—The brain is taking on the adult characters. The choroid folds into the lateral ventricle, is partly formed, and the paraphysis well marked. Though the corpus striatum and optic thalamus can be detected, they are not as yet well formed. The spinal cord on section is almost round. The central canal is still very large, and on section somewhat club-shaped. The cellular elements are much more numerous round the posterior half than on anterior; the anterior grey columns are, however, larger than the posterior, so that the whole grey matter of the cord becomes on section almost round. The anterior and posterior white columns are both fairly well formed, but contribute still further to giving the cord a rounded appearance. There is as yet no trace of a posterior fissure.

Sense organs.—The nose is well formed, though the turbinals are as yet but imperfectly formed. Jacobson's organ is well formed, and is typically marsupial in character. The eye is still imperfectly formed. The layers of the retina are not yet

differentiated; in the anterior two-thirds only of the pigment layer is pigmentation present; there is still a lumen in the lens; and a very minute lumen can still be traced in the optic stalk. The internal ear much resembles that in the previous embryo, but here, though the cochlea is still moderately straight at its anterior end, the first indications of coiling have commenced.

Heart and vessels.—At birth the permanent circulation becomes established, and even already in this specimen the ductus arteriosus is no longer patent, and the umbilical vein is obliterated. The foramen ovale is closed.

Lungs.—The lungs at birth exhibit a very interesting condition. The bronchi are as yet but very imperfectly formed, and the ramifications but few, and as the lungs have at this early stage of development to be functional, the bronchi have become dilated into very large irregular air-spaces to increase the surface of the mucous membrane. The trachea and the upper part of the two main bronchi are supported by imperfect cartilaginous rings. The air-sacs open either directly into the main bronchi or into the secondary bronchi. Connected with the bronchi are numerous comparatively small irregular tubular ramifications, which probably represent the further development of the bronchial system, and which as yet are probably not functional.

Alimentary canal.—The alimentary canal is now well formed,

is performed by the Wolffian bodies. The true kidney is developed much in advance of the condition in Embryo F, though still much too imperfect to be functional. The upper end of the kidney is almost on a level with the top of the Wolffian body, and on the right side is practically in contact with the liver. The Muellerain duct can be traced for nearly half a millimètre. The suprarenal bodies are of large size. The genital glands are of considerable size, and the sex may possibly be differentiated, but I should like to examine more than one embryo of this stage, and some later specimens in which the sex is undoubtedly defined before being sure on this point.

In describing this and the earlier embryos there are one or two points which I have refrained from dealing with, such as the mammary glands, thymus, thyroid, &c., as a further examination will require to be made of later stages before the early condition of the mammary glands can be satisfactorily understood; and though the earliest embryos here described show the thymus and thyroid in very interesting conditions, still earlier specimens will be required to show their modes of development.

Later Mammary Fœtuses.

With the limited time at my disposal it is practically impossible for me at present to follow the later development of the various organs throughout the developing mammary fœtuses; but as opportunity offers the developmental history of certain structures will be fully traced. At present I am engaged in working out the development of the shoulder girdle and of the skull, and trust shortly to be in a position to give an account of the development of the mammary glands and pouch. As many of the post-natal stages will be used in future work, and as there is much of interest in the external anatomy, I have thought it well to give a description of a number of typical examples of the smaller mammary fœtuses.

The most noticeable change that takes place in the embryo shortly after birth is a considerable increase in size of the abdominal region. This is doubtless due to the greater development

of the small intestine, and to the distention of the stomach and intestines with the ingested milk. This feature is well shown in the embryo of 16 mm., greatest length, shown in Plate xxiii., fig. 8. This embryo, though but little longer than the newly-born specimen, is, owing mainly to the abdominal distention, of much greater bulk. The epitrichial layer is apparently rather thicker, so that the position of the eye can scarcely with certainty be made out. The umbilicus is quite healed, but the scar is still distinct. There is as yet no indication of the pouch or scrotum. The following are some of the principal measurements :—Head length, 7 mm.; snout to root of tail, round the dorsal curve, 28·5 mm.; tail, 4·5 mm.; arm from elbow to tip of middle digit, 5·7 mm.; leg from knee to tip of 4th digit, about 3·5 mm.; foot, about 2 mm.

Beyond a general increase in size there is little change in the external appearance of the mammary fœtus for some time. A fœtus of 19 mm, greatest length, is shown in Plate xxiv., fig. 9. The two chief points of interest in this embryo are that rudimentary claws are now distinctly present on the four toes of the hind foot, and that, whereas at birth and for a short time afterwards, the nipple is grasped by the tongue and upper lip, here and in all the later stages, the tongue is entirely within the mouth, and the nipple is grasped between the upper and lower lips The umbilical scar is still apparent, but as yet there is no evidence externally

will reveal the different characters at a considerably earlier stage, but while in an embryo of 20 mm. or even 22 mm. it is impossible to tell the sex from external examination, in an embryo of 23 mm. this can usually be told, and there is not the slightest difficulty in any of the later stages.

A beautifully preserved male embryo of 23·8 mm., greatest length, is shown in Plate xxiv., fig. 10. In most respects this embryo resembles the earlier stage figured, but the distinct advance can be seen in the further development of the hind limbs. The umbilical scar can still be made out, but is well covered with epithelium. In the lower part of the abdomen and extending across the middle line is a somewhat indistinct bilobed slight elevation. This is the earliest external manifestation of the scrotum. The following are the principal measurements at this stage :—Head, 9·5 mm.; snout to tail, 38 mm.; tail, 6 mm.; arm, 8 mm.; leg, 5 mm.; foot, 3·5 mm.

In the female embryo the pouch begins to appear as a median depression in the lower part of the abdominal region.

Plate xxiv., fig. 11, represents a female embryo of 27 mm., greatest length, with the nipple still retained in the mouth. The pouch is well marked, and the clitoris is large and still indistinguishable externally from the penis in the male. The pinna of the ear is beginning to free itself from the epitrichial layer. In addition to the claws on four toes of the hind foot, a rudimentary claw can now be detected on the hallux. There are as yet no external indications of hair. The following are the principal measurements :—Head, 10 mm.; snout to tail, 41·5 mm.; tail, 7 mm.; arm, 10 mm.; leg, 6 mm.; foot, 3·8 mm.

In an embryo of 30 mm., greatest length, hair has already appeared on the sides of the head, along the shoulders, down the arms as far as the elbows, and along the sides of the body to the lower part of the chest. The pinna of the ear, though still closely applied to the side of the head, is practically free. The principal measurements at this stage are :—Head, 12 mm.; snout to tail, 47 mm.; tail, 8·5 mm.; arm, 11·5 mm.; leg, 7·5 mm.; foot, 4 mm.

large and external. Though hair is found on all the parts where hair is found in the adult, the hairs are so small that the embryo still looks quite naked. With the exception of the vibrissæ, the few large specialised hairs in other parts, and some longer hairs round the lips, none of the body hairs is longer than half a millimètre, and almost all the hairs are situated at least half a millimètre apart. The vibrissæ are well developed, and large specialised hairs are also found in the following situations:—Two large hairs above each eye, a row of five large hairs on the cheek under and a little behind each eye, a couple from a median papilla on the posterior part of the symphysis of the lower jaw, a couple from a papilla on the extensor surface of the forearm near its middle, a bunch of 8 or 9 from a large papilla near the union of the middle with the lower third of the flexor surface of the forearm, and a couple of large hairs which spring from the inner side of each heel. All these enlarged hairs are at least 6 mm. in length, and the vibrissæ are mostly a trifle over 10 mm. in length. The claws of the syndactylous toes are not yet specialised, though large and well formed. The following are the

Plate XXIV.

Fig. 9.—Mammary fœtus, 19 mm., g.l.
Fig. 10. ,, ,, 23·8 mm., g.l.
Fig. 11. ,, ,, 27 mm., g.l., (with nipple).
Fig. 12. ,, ,, 15 mm., head length, (with nipple).

Plate XXV.

Fig. 13.—Mammary fœtus, 23·5 mm., head length.
Fig. 14. ,, ,, 34 mm. ,,

Figs. 1-13 variously magnified; fig. 14 natural size.

Figs. 1, 2, 3, 4, 6, 9, 10, 11, 12, 13 and 14 are drawn from nature; figs. 5, 7 and 8, from photographs by Dr. Beard.

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In the earliest list of the fishes of Lord Howe Island* five genera were recorded the species of which were indeterminable, namely:—*Pseudoscarus*, *Balistes*, *Gobioides*, *Petroscirtes* and *Lotella*. It is satisfactory to me to be able to announce that two of these can now be supplied with specific names, the *Petroscirtes* having been described by me as *P. icelii*,† while the *Lotella* is here identified with the Australian *L. callarias*. We are still in the dark, however, as to what species of *Pseudoscarus*, *Balistes* and *Gobioides* occur in the seas of the island, and to these I am unfortunately compelled to add a species of *Canthidermis* which from its small size I am unable to determine satisfactorily. Of course this may be the young of the species upon the evidence of whose upper jaw the presence of a balistid was recorded in 1889; I have also a note of an undetermined species of *Ophisurus* and one also of *Plagusia*. There is also in this collection a scopelid in too bad condition to be recognisable.

The present additions bring the number of species recorded as inhabiting or visiting the shores of the island up to 113, with 7 (or 6) unidentified forms; doubtless if an expert were to spend a few weeks there this number could be largely increased, since many families which should be common are at present represented by few or no species. As it is the list, as it now stands, needs careful revision, but I hope within the next few months to be in a position to lay before the Society a thoroughly revised and enlarged catalogue of the fish-fauna of the island.

The resemblance between Maderia and Lord Howe Island which has been noticed by many authors and which was strengthened by the discovery of a species of *Tetragonurus*‡ some thirteen years ago now receives additional confirmation in the discovery of a genus allied to *Nealotus*, Johnson, a fish so rare

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* "Lord Howe Island: its Zoology, Geology, and Physical Characters" (Austr. Mus. Mem. No. 2), Fish. pp. 52 to 74 incl., by J. Douglas Ogilby, 1889.

† Proc. Linn. Soc. N.S. Wales, xix. 1894, p. 370.

‡ Macleay, Proc. Linn. Soc. N.S. Wales, x. 1886, p. 718 (as *Ctenodax wilkinsoni*) and l.c. xi. 1886, p. 511; Ogilby, l.c. xiii. 1888, p. 9.

that though described thirty-three years ago the original type is still unique, if we except a small example dredged by the "Challenger" in the North Atlantic and supposed to belong to Johnson's species.

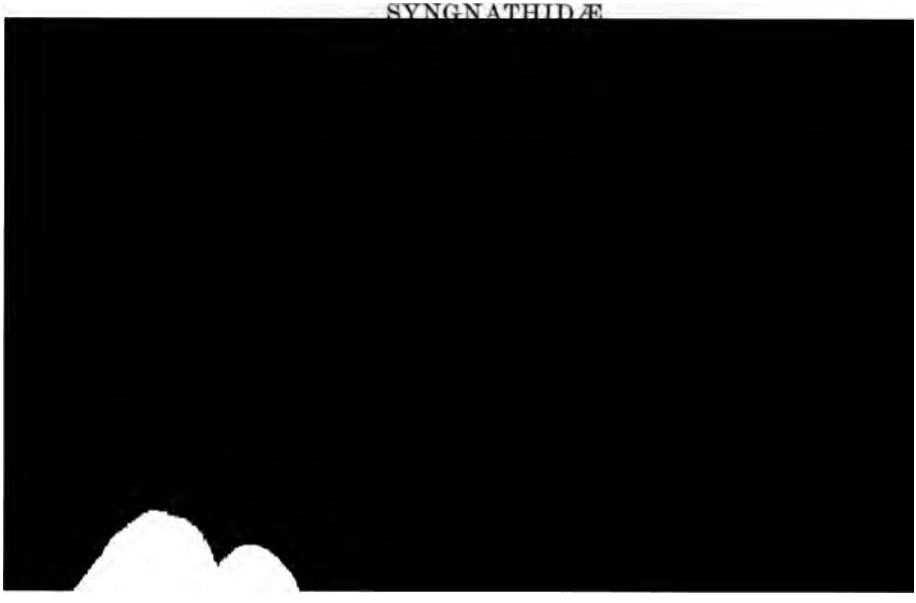
Appended are notes and descriptions of the species new to the island :—

GALEIDÆ.

Prionace glauca (Linnæus).

During Mr. Brodie's last visit he captured a large female Blue Shark from which he saw no less than 46 living young taken; a few of these he secured and preserved, and on his return kindly presented a pair to me, so that I am enabled to satisfactorily identify the genus, of which but one cosmopolitan species is recognised. This shark is said by Johnston to be common in Tasmania, and the British Museum possesses "numerous fœtus" from Port Arthur. Tenison-Woods included it in his list of New South Wales fishes, but gives no authority for the statement, which has not since been verified. I had never seen an example until Mr. Brodie showed these now under consideration to me, and it is not included in Lucas' list of Victorian fishes, which facts seem to prove that it is only locally "common" in Tasmania.

SYNGNATHIDÆ.



time recorded from Australasian seas; it had, however, previously been recorded from many parts of the Malay Archipelago, if we follow Günther in identifying Bleeker's species with it.

HOWELLIDÆ, fam.nov.

Body oblong, compressed, covered with strongly ctenoid, adherent scales. Lateral line present, interrupted. Head entirely scaly. Mouth with rather large oblique cleft. Premaxillaries protractile; maxillary large, with supplemental bone. Dentition feeble. Nostrils separate, the posterior trenching upon the orbital ring. Eyes lateral, large. Preorbital of moderate width. Opercle, interopercle, and subopercle spinigerous. Gills four, a slit behind the fourth; four branchiostegals; no barbels. Two separate dorsals, the spinous not depressible in a scaly groove; anal with three spines; ventrals thoracic, with five soft rays; pectorals elongate; caudals deeply forked, with sharp basal fulcra above and below. Colouration dark.

Omitting the barbuliferous families *Polymixiidæ* and *Mullidæ*, which do not appear to bear any close relationship to the true berycids there are still left three families—*Monocentridæ*, *Anomalopidæ* and *Holocentridæ*—in which the dorsal fin is wholly divided or deeply notched. To these must now be added the *Howellidæ*.

The following analysis will serve to distinguish the families:—

a. Head with luminous glands.

b. Luminous glands on the lips, immobile: scales large and coarse; eight branchiostegals; dorsal spines strong, more or less isolated; ventral rays rudimentary, 2 to 4.

MONOCENTRIDÆ.

bb. Luminous glands below the eyes, mobile; scales small; seven branchiostegals; dorsal spines weak, connected; ventral rays normal, 5.

ANOMALOPIDÆ.

aa. Head without luminous glands.

c. Lateral line continuous; jaws, vomer and palatines toothed; eight branchiostegals; dorsal fin continuous, deeply notched; four anal spines; seven soft rays in the ventral.
HOLOCENTRIDÆ.

cc. Lateral line interrupted; jaws with a single series of minute teeth; four branchiostegals; dorsal fins widely separated; three anal spines; five soft rays in the ventral.
HOWELLIDÆ.

It is plain that in face of such important differences as these I had no option but to establish a separate family for the reception of *Howella*.

HOWELLA, gen.nov.

Scales moderate, smooth except at the base, where there are several series of short, crescentic striæ, the middle denticulations enlarged and spine-like. Lateral line doubly interrupted, the tube simple and linear, occupying the entire exposed portion of the scale. Head rather large, with short blunt snout. Jaws equal. Maxillary exposed, scaly. Jaws with a single series of minute teeth; vomer, palatines, pterygoids, and tongue toothless. Preopercle feebly serrated; opercle with two basally adnate spines; a very strong spine on the subopercle and a weaker at the posterior

HOWELLA BRODIEI, sp.nov.

D. viii, i 8. A. iii 6. L. lat. 37 (1 + 8 + 28). L. tr. $\frac{2}{7}$.

Dorsal profile more convex than the ventral. Lateral line interrupted above the base of the pectoral and again slightly in advance of the second dorsal. Depth of body $3\frac{1}{2}$, length of head $2\frac{7}{11}$ in the total length; width of head $2\frac{2}{5}$ in its length. Diameter of eye $2\frac{5}{6}$, length of snout 4 in the head. Interorbital region gently convex, its width $3\frac{3}{4}$ in the head. Maxillary extending to the vertical from the anterior border of the eye, its length from the tip of the snout rather more than $\frac{1}{3}$ of the head, its width at the distal extremity $\frac{2}{7}$ of the diameter of the eye. Border of preopercle partly hidden by overlapping scales, with a few feeble serræ above the angle; upper opercular spine the longer; subopercular spine the longest and strongest, its free portion $\frac{1}{3}$ of the eye. Gill-rakers 6 + 21, the longest $\frac{3}{8}$ of the eye. Dorsal fin originating behind the base of the pectoral, its distance from the tip of the snout $2\frac{3}{8}$ in the total length; first spine short, $\frac{2}{9}$ of the second, fourth longest, $\frac{1}{2}$ of the head; first to sixth spines with their bases approximate, the two last well separated; spine of second dorsal as long as the rays, $2\frac{2}{3}$ in the head; interdorsal space as long as the second dorsal: anal originating behind the second dorsal and midway between the opercle and the caudal fin; first spine short, third equal to the spine of the soft dorsal but a little shorter than the rays: ventral spine subequal to the longest dorsal spine, not so long as the outer ray, which is $\frac{4}{7}$ of the length of the head and $\frac{5}{7}$ of the distance between its origin and the vent: eighth and ninth pectoral rays the longest, reaching to the end of the base of the anal and $\frac{2}{5}$ of the total length: middle caudal rays $\frac{3}{7}$ of the outer, which are $3\frac{2}{5}$ in the total length; caudal peduncle long, its least depth $2\frac{1}{5}$ in its length behind the dorsal, which equals the depth of the body. Shining purplish-black, the sides of the head and base of the pectoral with a silvery lustre; fins somewhat lighter.

Described from a single specimen forwarded by Mr. King and measuring 79 millimeters over all; it is in almost perfect condition, though evidently picked up dead on the beach.

I am pleased to have this opportunity of naming so interesting a species for my friend James Adam Brodie, Esq., Visiting Magistrate of Lord Howe Island, who has been indefatigable in his endeavours to assist me in elucidating the ichthyological fauna of this lonely oceanic islet.

GEMPYLIDÆ.

Machærope, gen.nov.

Body elongate, strongly compressed, the ventral profile subcultrate. Scales moderate, delicate, concentrically striated, deciduous or few and scattered (as in *Nealotus*). Lateral line obsolete. Head large, the snout moderate and acute. Mouth with wide, oblique cleft. Lower jaw projecting. Premaxillaries not protractile; maxillary exposed. Jaws with a series of acute, compressed, distant teeth; anterior premaxillary teeth greatly enlarged, fang-like; palatines with a series of small, recurved teeth; vomer, pterygoids, and tongue smooth. Nostrils separate, situated in a groove. Eyes large, lateral, round. Opercle deeply notched, the lower limbs forming a broad spine-like point. Gill-

Distribution:—Lord Howe Island.

From *Nealotus* this genus may at once be distinguished by its strong thyrsitoid dentition, from *Promethichthys* by the presence of the spine behind the vent, from all the other *Gempylidæ* (the unmistakable *Gempylus* excepted) by the constitution of the ventral fins.

MACHÆROPE LATISPINIS, sp.nov.

D. xx, i 17 ii. A. i 14 ii.

Depth of body $8\frac{2}{3}$, length of head 4 in the total length; width of body $\frac{3}{7}$ of its depth. Diameter of eye $\frac{1}{4}$ of the length of the head and $\frac{2}{3}$ of that of the snout, which is $\frac{2}{5}$ of the distance between its extremity and the origin of the spinous dorsal. Interorbital region concave, its width $5\frac{1}{2}$ in the length of the head. Maxillary extending to the vertical from the anterior third of the eye, mandible not quite to the posterior border; length of the former from the tip of the snout $2\frac{1}{3}$ in the head, its width at the distal extremity $\frac{3}{8}$ of the diameter of the eye; length of mandible $\frac{5}{8}$ of the head. Premaxillaries with three pairs of curved canines anteriorly, mandible with one pair much smaller and lanceolate; 11 lateral teeth on each ramus of the upper jaw, 8 to 11 on the lower. Anterior nostril smaller than the posterior, which is oval and subvertical, its distance from the eye $\frac{3}{5}$ of a diameter of the eye. Opercle with feeble radiating striæ and numerous minute shallow pits. Outer border of spinous dorsal sinuous, the fifth and tenth spines the longest and subequal, $3\frac{1}{4}$ in the length of the head, but scarcely as long as the anterior rays; last spine $3\frac{1}{5}$ in the longest: anal commencing beneath the origin of the soft dorsal, its distance from the vent $\frac{3}{4}$ of the diameter of the eye; posterior dorsal and anal finlet the longer: ventral spine a little longer than the postanal, $\frac{3}{5}$ of the eye: pectoral with 13 rays, originating below the second and ending below the seventh dorsal spine, its length $\frac{1}{2}$ of the head: middle caudal rays $\frac{4}{7}$ of the outer, which are $\frac{1}{8}$ of the total length; least depth of caudal peduncle $\frac{5}{8}$ of its length behind the dorsal finlets and $\frac{1}{3}$ of the depth of the body. Metallic blue, darkest above: fins lighter.

Etymology:—*latus*, wide; *spina*, spine: the two ventral and the postanal spine being strongly compressed.

Distribution:—Lord Howe Island.

Mr. King's collection contains a single specimen, 155 millimeters in length, of this interesting fish.

BALISTIDÆ.

Among the specimens collected for me by Mr. King is a young balistid, 50 millimeters in length, which appears to be allied to *Canthidermis maculatus*. Günther* unites all the various forms of *Canthidermis* under two headings, *Balistes maculatus* and *Balistes aureolus*, and in all the forms of *B. maculatus*, as given by him (with the exception of the one mentioned below), the second dorsal and anal rays are much higher anteriorly, especially in the adult, and this indeed is made a generic character by Bleeker; but in my example, which is of course very young, these fins are regularly convex, the middle rays being the longest, as in Hollard's *Balistes brevissimus*, which Günther reduces to a synonym of *Canthidermis maculatus*. But the main reason which has determined me to refer this species to *Canthidermis* lies in the absence of the postbranchial shields, which are found in all the other genera with which I am acquainted. That the absence of these shields is not due to the immaturity of the specimen appears to be sufficiently assured by their presence and indeed

of head $2\frac{1}{2}$ in the total length; upper profile of head rhombic. Diameter of eye $3\frac{2}{5}$ in the length of the head and $2\frac{1}{4}$ in that of the snout, which is $3\frac{5}{8}$ in the total length and $2\frac{1}{2}$ times the distance between the eye and the gill-opening. Interorbital region flat, its width $\frac{1}{2}$ of the head. Gill-openings vertical, very small, about $\frac{2}{7}$ of the diameter of the eye, and encroaching upon the base of the pectoral fin. Dorsal spine originating behind the vertical from the eye but not so far back as the gill-openings, its distance from the tip of the snout $\frac{3}{5}$ of that from the base of the caudal, coarsely granular anteriorly on its proximal half, the distal portion with two series of strong spines directed downwards, its height $\frac{5}{7}$ of the length of the head; second dorsal commencing nearer to the origin of the dorsal spine than to the base of the caudal, its rays and those of the anal rather low, with convex outer border, the anterior middle rays the longest, about $\frac{1}{7}$ of the spine: ventral spine well developed, fixed, spinulose, the free portions $\frac{3}{4}$ of the diameter of the eye: pectoral with 13 rays, a little shorter than the snout, but longer than the caudal, which is rounded; width of caudal peduncle $\frac{3}{7}$ of its least depth, which is less than its length. Pale bluish above, yellow below; upper half of body with three irregular series of round dark brown spots; caudal peduncle dark bluish-brown.

MONACANTHIDÆ.

In the official list of the fishes obtained during the visit of the Thetis to Lord Howe Island last autumn Mr. Waite records the capture of an example of *Monacanthus nitens*, and a second is now included in my collection. Günther* places this fish among the undetermined species and does not therefore describe it, and as the work in which its original describer published his diagnosis is not easily attainable by the ordinary student it will not be out of place to redescribe the species here.

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* Catal. Fish. viii. p. 229.

? MONACANTHUS NITENS.

? *Monacanthus nitens*, Hollard, Ann. Sc. Nat. (4) ii. 1854, p. 364, pl. xiv. f. 4, Tongatabu.

Monacanthus nitens, Waite, Proc. Linn. Soc. N.S. Wales, xix. 1894, p. 224, Maroubra Bay and Thetis Report, p. 62, 1898.

D. 26-29. A. 26-28.

Scales of body indistinct, each bearing a strong conical spine, erected upon a broad base, and increasing in size posteriorly; all the fin rays spinulose; no caudal armature. Depth of body at the base of the ventral spine $1\frac{4}{5}$ to $1\frac{8}{9}$, length of head $2\frac{1}{6}$ to $2\frac{1}{4}$ in the total length; upper profile of snout concave, of interorbital region strongly convex, of interdorsal space flat. Eye high, but not encroaching on the dorsal profile, its diameter $2\frac{3}{5}$ to 3 in the length of the snout, which is $3\frac{1}{5}$ to $3\frac{2}{5}$ in the total length. Interorbital width equal to the eye. Gill-opening small, $\frac{3}{5}$ to $\frac{4}{7}$ of the eye, but little oblique, situated below the posterior border of the eye and extending downwards to opposite the upper third of the base of the pectoral fin. Dorsal spine originating above the middle of the eye, the distance between its origin and the tip of the snout $1\frac{8}{9}$ to 2 in that from the base of the caudal; the sides are armed with a series of very long, acute, widely separated barbs,

a shining metallic gloss; snout, lower surface of head, thoracic and ventral regions lighter; fins pale yellow.

Distribution:—Tonga-tabu; Lord Howe Island; New South Wales.

Apparently this is a small species: Hollard's example measured 50 millimeters and the two from which my description is drawn up were but 48 and 45 respectively.

I am not fully satisfied as to the identity of this species with *M. nitens;* Hollard's description of the armature of the dorsal spine does not agree well with that of this fish; he describes it as being provided with three small points in front and stronger ones behind. If he had had the privilege of examining my specimens it seems scarcely possible that he could have overlooked the long, acute, *outwardly directed*, and conspicuously alternate scales. Again, he describes the armature of the scales as consisting of "short, obtuse, compressed" spines, while in our examples these are long, acute and conical. Both my specimens have 14 pectoral rays instead of 11 or 12 as found by Hollard.

Should future research necessitate the separation of the two forms I would propose, for the Lord Howe Island and New South Wales fish, the specific name *alternans*, in allusion to the remarkable alternation of the lateral teeth on the dorsal spine.

MALACANTHIDÆ.

Malacanthus hoedtii, Günther.

A fine specimen, 282 millimeters long, is in Mr. King's collection, and is a further addition to the fauna of Australasia. The species had previously been recorded from Mauritius, New Guinea, the Louisiade Archipelago, Solomon and Sandwich Islands.

BLENNIIDÆ.

Salarias insulæ, sp.nov.

D. xiii 19. A. 21.

Depth of body $3\frac{1}{5}$, length of head $4\frac{2}{7}$ in the total length; width of head $\frac{5}{9}$, depth of head $\frac{2}{7}$ of its length. Snout subvertical,

convex anteriorly, its length $1\frac{1}{3}$ times the diameter of the eye, which is $3\frac{2}{5}$ in the length of the head. Interorbital region flat, its width $\frac{2}{5}$ of the eye and $8\frac{3}{4}$ in the head. Cleft of mouth extending to the vertical from the hind margin of the eye. A short multifid nasal tentacle; orbital and nuchal tentacles simple. Dorsal fin originating in advance of the base of the pectoral; fifth spine longest, $1\frac{1}{3}$ in the head and not quite so high as the middle rays: anal originating below the first dorsal ray: inner ventral ray the longer, $\frac{3}{4}$ of the head and $\frac{1}{2}$ the distance between its origin and the anal: pectoral with 14 rays, the 10th and 11th the longest, reaching to the vertical from the vent, and a little longer than the head: caudal fin subtruncate, $4\frac{1}{2}$ in the total length; caudal peduncle deep, $1\frac{1}{2}$ times its length behind the dorsal fin, and $\frac{1}{3}$ of the depth of the body. Dark olive-green, nearly black, above, becoming lighter below, where it is densely powdered with darker specks.

Etymology:—*insulæ*, of the island, *i.e.*, Lord Howe.

Distribution:—Lord Howe Island, a single example, 65 millimeters in length.

Salarias alboapicalis, sp.nov.

Salarias variolosus (not Cuvier & Valenciennes) Günther, Fisch. Südsee, Heft vi. p. 203, pl. cxviii. f. c.

rays: anal originating below the dorsal notch: inner ventral ray the longer, $\frac{5}{7}$ of the head and rather less than $\frac{1}{2}$ the distance between its origin and the anal: pectoral with 15 rays, the 12th the longest, reaching to the vertical from the vent, and as long as the head: caudal $3\frac{7}{8}$ in the head; caudal peduncle deep, $1\frac{2}{3}$ times its length behind the dorsal fin, and $4\frac{1}{3}$ in the depth of the body. Dark chocolate-brown, almost black, the abdomen somewhat lighter; head and anterior parts of the body with scattered bluish dots: anterior dorsal rays more or less fully tipped with white.

Etymology:—*albus*, white; *apicalis*, at the apex, tipped: in allusion to the white extremity of the first dorsal fin.

Distribution:—Lord Howe Island: Samoa; Tonga; Society and Sandwich Islands.

Mr. King has sent me a single specimen 53 millimeters in length; specimens, however, measuring as much as 125 millimeters were obtained under stones at low water mark by Mr. Saunders in 1888 as recorded by the writer.* Although this is undoubtedly the fish figured by Günther under the name *Salarias variolosus*, I cannot agree with that author as to the identity of his species with that of Valenciennes. The latter gives the dorsal formula as $\frac{1}{12}$, and states that the dorsal fin reaches to the caudal, while he makes no mention of the conspicuous white patch on the spinous portion of that fin, nor of the equally conspicuous fimbriated lips In the latter case Günther is in accord with the French author in overlooking a character which is in fact generic. On account of this and certain other peculiarities I propose shortly to formulate a genus for the reception of *Salarias albapicalis* and its allies.

BROTULIDÆ.

DIANCISTRUS, gen.nov.

Body oblong-elongate, compressed, enveloped in a loose wrinkled skin, which on the head conceals all traces of the membrane bones.

* Lord Howe Island, Fish. p. 62, 1889.

Scales moderate, cycloid, striated, deciduous. Lateral line obsolete. Head naked; muciferous cavities well developed. Mouth terminal, with wide oblique cleft; jaws subequal. Premaxillaries slightly protractile; maxillary exposed, spatulate, without odontoid process. No barbel nor cirri. Jaws with a band of villiform teeth, widest at the symphysis; premaxillaries with several pairs of strong, acute, conical teeth anteriorly behind the villiform teeth; mandible with a series of enlarged trenchant teeth, which are strongest and recurved along the sides; vomerine teeth in a broad subcrescentic band, the inner series consisting of enlarged, well separated teeth; palatine teeth in a broad, elongate band, the inner series similarly enlarged. Nostrils inconspicuous, in front of the eye. Eyes small, sublateral, anterior. Opercle with a small spine. Gill-openings wide; gill-membranes united in front, free from the isthmus; six branchiostegals; no pseudobranchiæ; gill-rakers short, claviform, few in number. Vent in advance of the middle of the length. Genital papilla spine-like, provided with a pair of curved claspers. One dorsal fin, originating midway between the pectoral and the vent, and terminating a short distance from the caudal; anal originating about the middle of the body and united by membrane to the base of the caudal; dorsal and anal fins with the rays simple and hair-like, their bases enveloped in thick skin; ventrals contiguous, inserted a little in advance of the pectorals, each developed as a

tip of the snout and the origin of the anal. Diameter of eye $8\frac{2}{3}$ in the length of the head and $2\frac{1}{9}$ in that of the snout, which is obtusely rounded, declivous, and twice as wide as long. Interorbital region convex, its width $3\frac{1}{4}$ in the length of the head. Maxilla extending well beyond the vertical from the posterior border of the eye, its length from the tip of the snout $\frac{3}{7}$ of that of the head, its width at the distal extremity $1\frac{2}{5}$ times the diameter of the eye. Gill-rakers 2+7, the longest about $\frac{1}{2}$ a diameter of the eye. Distance of dorsal fin from tip of snout $\frac{1}{3}$, of anal fin slightly more than $\frac{1}{2}$ of the total length; posterior dorsal and anal rays the longest, about $\frac{2}{7}$ of the head: ventral filaments reaching to the vent, a little longer than the head: pectoral with 20 rays, $\frac{3}{4}$ of the head: caudal $1\frac{5}{6}$ in the head. Pale violet, with three well marked orange longitudinal bands; head uniform; fins pale yellow.

Etymology:—*longus*, long; *filum*, a thread.

Distribution:—Lord Howe Island. A single specimen, 86 millimeters long.

GADIDÆ.

Lotella callarias, Günther.

As recorded in my account of the fishes of Lord Howe Island (Austr. Mus. Mem. No. 2, p. 70) there has been a specimen of *Lotella* from this island in the collection ever since 1882; but in such a bad state as to preclude the possibility of accurate identification. It is satisfactory, therefore, to be in a position to announce definitely that the species found at the island is identical with that of our own coast and not the New Zealand *L. rhacinus*.

CONTRIBUTIONS TO A KNOWLEDGE OF THE AUSTRALIAN CRUSTACEAN FAUNA.

No. i.—Observations on the Genus *Neptunus*.

By David G. Stead.

Though the observations contained in this paper have all been founded upon specimens of *Neptunus pelagicus*, M. Edw., they will be found to apply equally as well to the other species of this genus, *N. sanguinolentus*, excepting in a few minor details, such as the colour of the carapace, which in *N. sanguinolentus* is of a lighter hue, is only minutely granular, and possesses three large almost circular spots, somewhat similar to drops of blood, surrounded by bluish-white rings, one on either side, on the epibranchial regions, and one almost on the posterior border of the carapace, over the intestinal region. So, but for these slight differences, and a few others of small account, the two species may be said to be morphologically the same.

N. pelagicus is the most common of our pelagic Brachyura, being the principal edible crab of the Sydney Fish Markets. Incidentally I might mention that great numbers of these are

Crustacea, I have always found that the best kind of bait is a large Chiton, deprived of its shell, of course. This being very tough, when attached to a large fish-hook, enables the crabs to gain a strong hold, without fear of the bait giving way. While in pursuit of these animals—especially *Grapsus variegatus*—I have sometimes witnessed a most ludicrous sight. When swinging the bait to and fro, like a pendulum, in some deep crevice of the rocks, arm after arm would be seen to shoot forth from every crack and cranny, as the bait passed along; some of the crabs even going so far as to spring out, in a wild endeavour to reach the coveted morsel.

The carapace, which is very wide, is drawn out on each side into a long acutely-pointed spine. In medium-sized and small specimens, as a rule, the carapace is covered with short dark setæ and very coarse granules; but in large examples these almost disappear (in some, both setæ and granules disappear altogether), and are much wider apart. This is worthy of note, inasmuch as some zoologists would, perhaps, be inclined to make a specific distinction, if it so happened that they could only procure the two varieties mentioned, especially as the coarsely granular kind has, as a rule, a more sombre uniform colour than the larger and smoother form, which generally exhibits a beautiful mottled appearance. This variation in colour especially claims our attention, as it is thought by some observers to be a distinguishing sexual mark, whereas it is not so, both varieties—with transitional forms—being found in each sex.

The anterior portion of the carapace, with the subhepatic and pterygostomial regions, is bordered with a dense margin of plumose sensory hairs.

As I have stated elsewhere ("Zoologist," May, 1898), the sexes at certain times seem to keep quite apart, and occasionally there may be seen scores of females with not one male amongst them, and *vice versâ*.

They seem to be of a very quarrelsome nature, as it is quite a common occurrence to find specimens minus part of a "nipper" or leg.

The spawning season is about August, September, October, and November. I have not up till the present time been able to gather sufficient data to enable me to say positively when it commences or terminates, but hope shortly to be in a position to state this with certainty. As might be expected, the species is of a predaceous, roving disposition, and is very widely disseminated. As in a great many other Brachyurans, so here the males greatly preponderate.

Masticatory Organs:—These consist of the usual six pairs.

(1) *Mandible* (Fig. 1, F). This is a very powerful instrument adapted for cutting only (not crushing, as in some); the anterior edge being developed into a curved sharp blade-like prominence. It is furnished with a 2-jointed palp, which is fringed with fine sensory hairs.

(3) *Second Maxilla* (Fig. 1, D). This has the same flattened leaf-like character as the one preceding, but differs considerably, and is more interesting to us, inasmuch as the epipoditic portion forms the *Scaphognathite* (Fig. 1, D, *Sc.*). On the upper and lower borders it is fringed with fine rather short hairs; these, I believe, are modified forms of the hairs on the epipoditic portions of the three maxillipedes, which I will presently describe.

(4) *First Maxillipede* (Fig. 1, C). This and the two following appendages may really be divided into two portions, viz., the maxillipede proper and the epipoditic portion, having two distinct functions to fulfil. When we compare this appendage with the preceding we notice that a great change has taken place. The exopodite (*ex.*) which in the second maxilla is very small, almost spine-like, becomes here greatly developed. The description given further on of the exopodite of the third maxillipede may also be applied to this case, excepting that in this appendage the exopodite is relatively larger than that of either the second or third maxillipedes, and the long undivided portion is devoid of setæ. The remaining joints of the maxillipede proper are transformed into broad thin plates, edged with setæ. The epipodite consists of a rather broad, thin, membranous lamella, gradually narrowing towards its apex, and supported throughout its entire length by a central calcified shaft. This lamella is fringed with fine hairs, described further on. Just as in the second maxilla, where the epipodite has been greatly modified to form the scaphognathite, so, in the three maxillipedes, the epipodite has been considerably metamorphosed to render it subservient to a special function, which, in this case, is that of keeping the branchial chamber and the branchiæ themselves free from particles of dirt and other impurities, and to prevent the lodgment of parasites. Judging by the amount of dirt to be found on certain parts of the walls of the branchial chambers, the gills would soon become clogged were it not for the constant action of these scrapers (for such they are) moving over their internal and external surfaces. Viewing them macroscopically, it would not perhaps be at once evident how these scrapers effect their work, but when we subject them

to a microscopic examination we find that each hair is in reality a small rake in itself, having developed towards its extremity, along one side, three or more small hook-like protuberances (Fig. 1, G). In the maxillipedes, one set of muscles serves two purposes, as, when the maxillipede proper is moved in mastication, the epipodite or flabellum being fixed to it, also moves, and then in such a manner that it sweeps the gills from bottom to top, and *vice versâ*.

In the first maxillipede this flabellum is far larger than that of either the second or third maxillipedes. It sweeps the whole of the external surfaces of the eight branchiæ, and also to some extent the internal wall of the branchiostegite.

(5) *Second Maxillipede* (Fig. 1, B). This consists of an exopodite like that of the preceding appendage; a 5-jointed, rather palpiform endopodite, of which the meros is by far the largest joint, and the podobranchia. The flabellum in this case is a slightly calcified lamella, fringed with the before-mentioned hooked setæ. This sweeps the interior surfaces of the four anterior branchiæ and the corresponding part of the body wall.

(6) *Third Maxillipede* (Fig. 1, A). This large appendage consists of a 2-jointed basal portion, a 5-jointed endopodite, a 3-jointed exopodite, and the podobranchia. The first and second

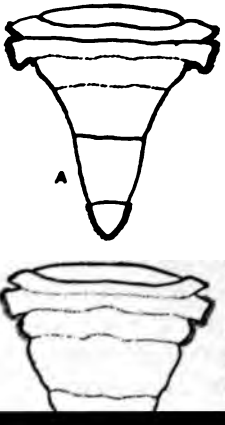
have sketched them. The flabellum is here a long somewhat oblong-ovate plate, fringed with hairs of the same nature as those before described (Fig. 1, G). The gill in this case is almost rudimentary (Fig. 1, A, *R.Br.*). It is quite obvious that even if the gill were fully developed on this podobranchia, it would be in the way, as this part has to move freely up and down, so the reason for its aborted condition is plain.

The flabellum of the second maxillipede, though serving a similar purpose to that of the third maxillipede, being very much shorter, and having to undergo far less movement, does not interfere with the accompanying gill, which, originating from its base, scarcely passes through any motion at all. The flabellum of the third maxillipede sweeps the internal faces of the four posterior branchiæ, and the adjacent portion of the wall proper of the thorax. As will be observed by referring to the diagram, the basal portion of the flabellum is devoid of the fine hooked setæ which characterise the remainder of it. This being so, the "brush" misses just in that one place. In several specimens in my possession, parasites, in the shape of tubicolous annelids, have taken advantage of this and have grown there undisturbed. This, of course, helps to prove that, were it not for these flabella the gills and walls of the branchial chamber would soon become clogged with parasites or dirt. Perhaps I may mention that not infrequently I have observed specimens in which the chelipedes and the subhepatic and pterygostomial regions also harbored parasitic annelids.

Branchial arrangement.—This is the same as that of *Cancer pagurus**, with the exception that the gill portion of the podobranchia of the third maxillipede is relatively far smaller, and in fact can scarcely be said to be more than rudimentary. The inner surface of each gill is clothed with short bristly hairs, which are here, perhaps, as an additional protection against parasites.

* "The Crayfish," Huxley, p. 277.

External sexual characteristics.—One of the first characteristics that is calculated to strike the casual observer in connection with the brachyurous crustacea is the difference in shape exhibited by the pleons of the different sexes. In most cases this is a sure guide to the sex, but not in all; as there are some, certain burrowing crabs, in which the structure of the pleon in both sexes is approximately the same. Here the only sure guides are the appendages, which lie concealed by the pleon (excepting a few species where the eyes of male and female exhibit some difference in shape).



The genus *Neptunus*, in common with some other genera, is characterised by three distinct types of pleon (Fig. 2).

The pleon of the male (Fig. 2, A), which is the narrowest, is composed of only five movable segments; the third being really formed by the coalescence of the third, fourth,

fourth the length of the following and terminal portion which is long, styliform, and tapers to a very fine point, perforated by the ejaculatory duct. The long terminal joint is supplied with short, almost spiniform, recurved hairs in the adult male. These would, perhaps, assist the animal to keep the organs in position during copulation. As compared with the first those forming the second pair of pleopoda (Fig. 3, D) are rather insignificant.* In conformation they are somewhat similar to the former, but are more lamellate. In adult males, the end of the last joint is always found inserted into the base of the terminal joint of the first pleopod.

The female pleon, which, comparatively, is by far the largest, consists of the full number of segments, all of which are movable upon one another. It is fringed with short setæ, and is capable of such extension as to be almost in line with the carapace. The sternal aspect is chiefly membranous, but is calcified in the central portions of each of the second, third, and fourth somites, so as to give support to the large appendages (pleopoda) to which the ova are attached. In this sex, the very large ovate openings of the oviducts are situated on the sixth thoracic segment at the base of the third pair of pereiopoda, but nearer to the mesial longitudinal line.

Each pleopod consists of a small protopodite, from which depends a terminal biramous portion (endopodite and exopodite). The endopodite is rather flat, 2-jointed, and is clothed with beautifully fine, long, yellowish, silky hairs. These are distributed in great number over the two edges, and posterior aspect only of the endopodite, the anterior aspect being quite free and smooth. The posterior face is ribbed, and between the ribs the hairs are attached in regular lines. To these hairs the minute ova are attached by a gummy secretion forming a pedicle. The length of this pedicle is variable, usually wide and short, about same length as diameter of ovum, but is sometimes long and narrow. The ova, which are

* This cannot be said of all the Brachyura, as in some (*Cancer*) the second pair of pleopoda is the longer.

[redacted] average after extrusion 4mm. in length, and [redacted] a remarkable one are of a yellowish colour.

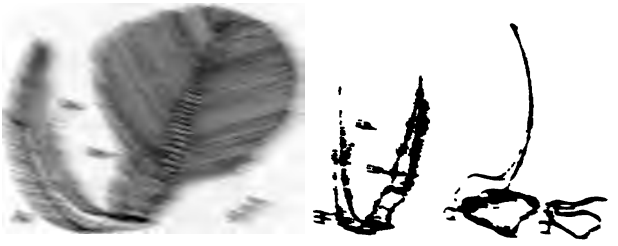


Fig. 1.—*Spelæonectes subterraneus*.

a, First Pleopod of Male; b, First Pleopod of Sterile Female; c and d, First and Second Pleopods (Copulatory Organs) of Male.

Ex. Exopodite. *En.* Endopodite.

The exopodite consists of one joint and Fig. 1, b, c, and is [redacted] with the rudiments of a terminal [redacted] one-eighth to one-fourth of the inner in length. The

ova--and they are not — fecundation could never take place owing to their inability to extend the pleon. Here the sternal aspect is chiefly membranous, though slightly calcified in the fore-part between the bases of the 1st and 2nd pairs of pleopoda. As in the male, this form possesses two hook-like protuberances on the sternal plastron, which fasten and keep the pleon in place. In the female these hooks are either rudimentary or are altogether absent. The pleon, in these sterile forms, adheres very tightly to the sternal plastron, so that some little force is required to detach it. Here the female genital orifices, though distinctly visible, are quite rudimentary. They are not perforated, though the oviducts are developed. As in the true female, there are four pairs of pleopoda (Fig. 3, B) all similarly shaped (though in this case they have undergone great modification and are considerably smaller than those of the female). The hairs clothing both exopodite and endopodite are here extremely short—almost rudimentary. Those clothing the former partake of the same plumose, sensory character as those of the same portion of the female, while those of the latter are of the same nature as the ovigerous hairs of the female. On first examining this kind some two years ago, I was led to think that, as it exhibited a good deal of resemblance to the female, it might be capable of developing into that sex through successive stages at each ecdysis; but in that case I should expect to find some connecting links between the two; this I had not been able to do, therefore I became of opinion that this form was immutable, but recently, much to my pleasure, by assiduous observation at the Woolloomooloo Fish Market, I have been able to find several specimens which I regard as approaching the female still more closely. In these the ovary was a little larger than usual (in fact, only a little smaller than that of the virgin female), the openings of the oviducts also, though still extremely small (too small for the passage of ova) were far more in evidence, the hairs on the pleopoda were considerably lengthened, and lastly the pleon was fringed with extremely short hairs. The pleon itself had not undergone much change, but this is not of very great moment. Incidentally, I might mention that one of the first things that

[redacted] sterile females was that I had never seen any signs [redacted] of sex. There was a very good [redacted] for this reason even supposing that any [redacted] had been excluded —and I have pointed out that this is impossible—they must inevitably have been lost in the later moults, the pleopods though of similar structure to those of the females are rudimentary; so that no ova could have become attached to them. The three reasons which I have already given, i.e. inability to extend the penis to allow of fecundation taking place, the rudimentary state of the vulvæ 3rd. rudimentary state of the receptacula seminis, exclusively demonstrate that this form or σ^2 is absolutely incapable of reproduction. Here it may be stated, that up to a fairly large size, viewed externally, it is impossible to discriminate between males, females and sterile females. After this stage is passed, the chelipeds of the male become comparatively much larger, attaining considerable proportions. The sterile females do not become any larger, and in comparative size of chela and a few other general characters, resemble the female, excepting that

affected, the pleon bearing some resemblance to the female. The appendages of the pleon in this case were wanting, those of the male being rudimentary. As will be at once perceived, the two cases are quite different, as in *Neptunus* the males are never affected, and the appendages, though modified, are never rudimentary; in fact, I have only found a very few isolated examples of the male pleon being at all malformed; and in these it was apparently due to some slight mutilation of the terminal segments. Here, the pleons bore no resemblance to those of the females or the sterile forms, the malformation merely consisting of an abbreviation of the last two segments, thus partially uncovering the first pair of pleopoda, which were in no wise affected. Prof. A. Giard, in speaking of *Sacculina* parasitic upon *Stenorhynchus phalangium*, says*: "In the infested females the influence of the parasite, which displays itself internally by the abortion of the ovules, betrays itself externally by a profound modification of the four pairs of ovigerous feet. These are very inferior in size to the normal state." Now, though the latter part of this agrees with the present case, in *Neptunus* the sterile form possesses an ovary, seminal receptacles and oviducts similar in appearance to, though smaller than, those of the female. The same authority continues: "All these modifications are produced in a more or less complete fashion, according as the crab has been infested at a more or less advanced age." That this does not apply to the present case will be at once evident, when I state that, in specimens that I have examined ranging from 1 inch to about 5 inches in diameter (including lateral spines) the pleon of the smallest exhibited these modifications in just as marked a manner as the largest, and I have never been able to discover any signs either of *Sacculina* or any other parasite.

I have merely quoted these two cases of parasitism to show that in the present instance it is not produced by the same causes. De Haan (Fauna Japonica) figures several species which possess these

* "Parasitic castration and its influence upon the male sex in the Decapod Crustacea." Ann. Mag. Nat. Hist., (5) Vol. xix. pp. 325-345, 1887.

three types of pleon. He styles them:—Males, females, and "spurious females." Some later writers, taking into consideration the already cited case of *Stenorhynchus phalangium*, have taken it for granted that the conclusions arrived at there would apply equally as well to all of the species in which three types of pleon obtain; but, as I have shown, they cannot be applied to the form under consideration.

In the foregoing remarks I have, as before stated, only referred to the genus *Neptunus*, but I feel sure that others amongst our native genera will be found to possess these sterile females. At present there are two species which I have good reason to believe agree in this manner with *Neptunus*, viz., *Ozius truncatus* and *Platyonychus bipustulatus*. The former lives among loose stones in rocky situations, whilst the latter, though really pelagic, spends most of its time half buried in the sand in shallow water.

I here desire to tender my sincere thanks to Mr. Jas. P. Hill, Demonstrator of Biology, for some kindly criticism during the course of my work; also to my friend, Mr. R. Grant, Physiological Laboratory, University of Sydney, for assistance most willingly rendered in various ways; and lastly, to Mr Whitelegge, Australian Museum, for assistance with the literature relating to the subject.

NOTES ON THE FERTILISATION OF SOME AUSTRALIAN AND OTHER PLANTS.

By A. G. Hamilton.

(Plate xxvi.)

PITTOSPOREÆ.

Pittosporum undulatum, *Andr.*—I have (3) given an account of the two forms of flowers noticed in this plant—1st, those with perfect stamens and pistils; 2nd, those with perfect pistils, but having stamens very short and converted into nectaries, and not functional as pollen-bearers. Since then, I have seen a tree in Dr. Lee's garden in Wollongong which sprang up as a seedling among ferns transplanted from the bush. In this tree the stamens are perfect but the pistil is imperfect and never sets seed. This completes the series of forms.

T. Kirk (2, p. 81) says of *Pittosporum eugenioides*, A. Cunn., "In this species the flowers are in many specimens practically unisexual: although both stamens and pistil are invariably present, one or other is abortive. The perfect stamens have longer and more slender filaments, and produce abundance of pollen: the imperfect stamens are carried on shorter, less slender filaments, and produce but little pollen. The pistil exhibits but little variation. Flowers with perfect and imperfect stamens may be produced on different trees, or both forms may be found on the same tree associated with perfect flowers: in the former case the trees are practically diœcious. Other New Zealand species of *Pittosporum* exhibit the same phenomenon."

Pittosporum undulatum has manifestly reached a farther stage of differentiation, as the various forms are never found on one tree, so far as my experience extends; the anthers in the second

form are always quite abortive, having only a couple of dozen ill-formed pollen-grains in the sacs, which never open, and the anthers are mere honey-secretors. The filaments are very short, almost suppressed.

In the other Illawarra species, *P. revolutum*, Ait., I have never seen any approach to this state of affairs. All the flowers are perfect.

PHYTOLACCEÆ.

PHYTOLACCA OCTANDRA, *Linn.*—This introduced plant spreads very freely in the Illawarra District. It is proterandrous, but the stigmas soon open and become mature, while the anthers retain their pollen for a long time. I have seen it visited by small pollen-eating beetles once or twice, but it is mostly self-fertilised. Every flower without exception is succeeded by a fruit. The flowers have a strong herbaceous smell, not at all sweet. Its rapid spread is accounted for by the fondness of birds for the fruits. They are eaten by the regent-bird, cat-bird, satin bird, several species of *Ptilotis*, the crow-shrike, and the domestic fowl. The fruit colours the excrement deeply, and the shining

flowers, of flowers from other branches, and from distant trees, with the result that although the ovulary swelled for a time, it ultimately dropped off. Practically, however, even using pollen from distant trees was the same as taking it from the same individual, as all the trees in the neighbourhood were taken as cuttings from the same parent tree. The clusters of flowers are large and very conspicuous, and the main crop is borne in winter and early spring when the trees are leafless, but flowers may be found on individual trees at almost any season. The clusters of flowers are visited by *Acanthorhynchus tenuirostris*, various species of *Ptilotis* and *Strepera graculina*. *Ptilotis* is especially fond of them, and numbers of these birds spend the day in the trees, probing the flowers and chasing each other about. With a butterfly net I captured one which flew into the house through an open window. On holding it in my hand and offering it a flower it immediately inserted its beak and cleaned out the calyx with its brush-tipped tongue and afterwards when set free in the room not only sucked flowers (if the expression sucked may be allowed) but took honey from a spoon and drank water freely when a glass was offered to it. It is to these birds that the pollination of the stigmas is mostly due, I think, as they are just of the right length of beak and head to gather pollen from the projecting stamens. In sucking the honey they insert the beak on the inner side of the curved petals, and the force they exert in pressing it causes the anthers to rub against the throat of the bird, depositing pollen there, which is transferred to the stigmas of other blossoms.

Belt (4, p. 130) gives an account of the pollination of the Palosabre (a South American species of *Erythrina*) by humming birds, which agrees in the main with the above, except that he does not mention any twist in the flowers, and that the chief object of the birds is the capture of insects which resort to the flowers. I have never seen bees visit the flowers of *E. indica*, but small beetles and flies frequent them, and are, no doubt, sought for by the birds. Müller (1, p. 215) quotes Darwin's statement on the authority of MacArthur that in N.S. Wales

Erythrina does not produce good fruit unless the flowers be shaken. He also mentions two species which are pollinated by humming-birds and one in which the process is performed by bees.

VITIFERÆ.

VITIS BAUDINIANA, *F.v.M.*—The four petals have the margin near the apex folded over to form a little hood. The four stamens are inserted on the base of the petals. The disk has a raised rim, inside of which and opposite to each stamen is secreted a single drop of nectar. The flowers are greenish, and are much frequented by a number of species of Diptera which carry pollen from flower to flower and deposit it on the stigma.

COMPOSITÆ.

HELICHRYSUM LUCIDUM, *Henck*.—In this plant the flowerets open on the circumference of the flower first, and the opening proceeds towards the centre. The open flowerets form a ridge all round the centre. They are much frequented by native bees in the middle and latter part of the summer. The insects work round the flower with legs straddling the raised rim, dipping their proboscides in each floweret, and stopping where there is nectar for a considerable time. In this way there is no doubt they fertilise the plant. I have also observed one of the blues,

the style lengthens rapidly and the ring of hairs round base of stigma sweeps the pollen out of the anthers and pushes it out at the orifice of the tube. At this stage the tip of the tube is hidden behind the posterior petals. Insects visiting the flowers force the posterior lobes of the corolla asunder, and pushing against the top of the tube are invariably dusted with pollen hanging to the anther-hairs. When the anthers are emptied of pollen the style lengthens so as to protrude between the posterior corolla-lobes, and the stigmatic lobes open (fig. 5) and are then ready to receive pollen from insect visitants. Haviland describes the process in *L. anceps*, Thunb., *L. gracilis*, Andr., *L. gibbosa*, Labill., and *L. debilis* (5, p. 182). I do not, however, find the latter plant named in Baron von Mueller's Second Census of Australian Plants. Pollen is always found scattered all over the lateral and anterior petals. The latter acts as a landing-stage for visitors.

PLANTAGINEÆ.

PLANTAGO LANCEOLATA, *Linn.*—Hermann Müller (1, p. 503) quotes Delpino's opinion that this species is a transitional form between anemophilous and entomophilous pollen-bearing plants. The latter observer in support of his theory describes three varieties which he noticed. First, the tall scaped form with very long and thin filaments; second, a hill-growing plant with shorter scape, but still essentially anemophilous; third, a mountain form with very short scape, short spikes and filaments, which were much visited by bees which collected the pollen. He goes on—"This therefore is a form of *Plantago* which hangs between the anemophilous and entomophilous conditions, and is capable of being fertilised equally well by the wind and by bees. If the filaments became stiff and coloured and the pollen grains adhesive, while the anthers lost their peculiar quivering, we should have before us the passage from anemophilous to entomophilous characters, the evolution of an entomophilous from an anemophilous species. This hypothetical transition has actually occurred. *Plantago media* is a form that has become entomophilous; the filaments have become pink, the anthers are motionless, the pollen

grains have become more aggregated, and it is visited regularly by *Bombus terrestris*."

I have been fortunate enough to find a host of *P. amoenissima* at Mount Kemiin which shows a further stage in the evolution of the *entomophilous* from the *anemophilous* condition. The plant was growing in a bare exposed situation, and as usual under such conditions the scape was short—about 3 cm. in length, the usual height being 20 to 40 cm. The scape was growing almost horizontally from the centre of the leaves, curving up slightly in the last 2 or 3 cm. The flowers presented the usual structure in all but one point. Instead of the usual very long and slender filaments, 7-10 mm., the anthers seemed to be sessile (fig. 6). Closer examination showed that they had short filaments about 1·5 mm., which were entirely hidden in the tube of the flower. The anthers were very full of pollen, but I could see no difference between them and those of flowers with long filaments on other plants. The flowers were protogynous as in the ordinary form, and in the second stage the stigma was red, withered and either hidden in the centre of the four anthers or lying closely pressed

colour. The filaments are about 1 mm. long out of the tube. The stigma is red. I have seen a head visited by small insects, either flies or bees, but they were so rapid in their movements that I could not determine which.

ASCLEPIDIACEÆ.

MARSDENIA FLAVESCENS, *Cunn.*—The individual flowers are small and dull-coloured, but as they grow in large and close umbels they are on the whole conspicuous. The scent is very rich and strong; and they produce abundance of honey. They are frequented by various species of flies, bees and butterflies, the latter almost always belonging to either the Lycænidæ or the Hesperidæ. I have not observed in any of the visiting insects the pollinia attached, and the plant does not fruit freely—three or four per cent., at most, of the flowers setting seed. A plant well in flower is a good lure, and the butterfly collector will find a visit to such on a warm day well repaid.

LABIATÆ.

PLECTRANTHUS PARVIFLORUS, *Henck.*—The flowers are arranged in fours like whorls, in a spike. The upper lip has three or four lobes; the lower lip is entire and deeply concave. The colour is purplish-blue and the flowers are sweet-scented. The stamens are four, two long and two short. They are mature before the stigma. When the flower opens the anthers are bent upwards above the concave lip (fig. 9), while the style with its as yet unopened stigma lies at the bottom of the concavity. Insects visiting the flowers at this stage take up pollen on their under surface. When the anthers have discharged all their pollen they bend down into the cup of the lower lip, while the style bending upwards takes their place, the stigma opening at the same time (fig. 10). In this stage the stigmas rub against insects and, taking up the pollen, are fertilised. The insects seen visiting are *Taractrocera papyria*, Boisd., and *Lycæna labradus*, Godt. The plants seed very freely. They flower almost all the year round.

The flower stalks, peduncles and calyx are closely covered with trichomes of two forms (fig. 11).

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EXPLANATION OF PLATE.

Lobelia dentata.

Fig. 1.—Hairs on petals.
Fig. 2.—Hairs on anther-tips.
Fig. 3.—Tube of stamens enclosing style.
Fig. 4.—Hairs round base of stigma.
Fig. 5.—Tube of stamens: stigma protruding and open.

Plantago lanceolata.

ON A SUPPOSED NEW GENUS OF THE N.O. *MYRTACEÆ.*

By R. T. Baker, F.L.S., Curator, Technological Museum, Sydney.

(Plate xxvii.)

The plant which forms the subject of this paper was obtained on one of the high spurs radiating from Mount Corricudgy and forming the watershed between the Red Water and an unnamed stream; these waters eventually join and then enter the Widdin Brook which flows north into the Goulburn River—a feeder of the Hunter River.

Mt. Corricudgy is the culminating peak of the main dividing range which forms the watershed between the Hunter and Capertee or Colo Rivers, and reaches a height of over 3,000 feet. The spurs running north towards the Red Water are very rugged and precipitous, and it is only with the very greatest difficulty they can be ascended or descended. It is doubtful if they had ever been visited by white men previous to this trip, which was only possible through the courtesy of Mr. J. Dawson, L.S. for the District, who had been authorised by the Government to "traverse" this hitherto unsurveyed portion of N.S. Wales.

Mr. Dawson admitted it was the roughest piece of field work he had performed during his 24 years' experience of surveying.

As this district had never before been botanically "worked," and is almost inaccessible, one naturally expected to find some undescribed plants, and I cannot say I was disappointed. From my collection I now describe what I believe is an unrecorded plant. It was found on the extreme end of a bold headland facing Nulla Mountain, Widdin Brook meandering at the foot of the ranges.

RYLSTONEA, gen.nov.

A delicate, slender, upright plant, rarely with more than one or two stems, under 3 feet high. Leaves small, decussate, terete or laterally compressed. Flowers axillary near the ends of the branches, pedicellate in pairs, borne on a common peduncle. Bracteoles scarious only on the edges, concave, enclosing the bud, not very deciduous, not keeled. Calyx-tube cylindrical, adnate part prominently 5-ribbed; lobes 5, divided into digitate lobes about twice as long as petals. Petals 5, entire, on a constricted base. Stamens 10, alternating with staminodia shortly united at the base in a single ring; anthers globular, opening in two minute pores, connective prominent. Ovary 1-celled, about 8 ovules on a peltate placenta, with two processes at the summit; style exserted, longer and thicker than in the cognate genera. bearded towards the end; stigma terminal, small. Fruits unknown.

Species one.

RYLSTONEA CERNUA, sp.nov.

An erect, glabrous, rather slender shrub, from 1 to 2 feet high Leaves decussate, crowded, terete or laterally compressed and then channelled above, narrowing below the middle, with a

5-10 divisions, except outer lobes which have accessory lobes. Petals entire, imbricate, obtuse, semicircular, contracted at the base. Stamens 10, in a ring at the base of the petals, filaments inclined to vary in length, being alternately long or short. Staminodia alternating with the stamens, ligulate, rather shorter than the stamens. Anthers globular, with two parallel cells opening by minute pores at the summit, or in centre of cells. Connective prominent, forming a central column to which the anthers are adnate for their entire length. Ovary 1-celled. Ovules about 8, attached to a peltate placenta connected with the base of the ovary by a filiform attachment, the top of the placenta bifurcating into two horn-like processes. Style well exserted, twice the length of the calyx-tube, thick at the base and tapering upwards.

Analysis of cognate genera.

Calyx cylindrical, *lobes broad, entire* or shortly ciliate, flowers in heads. DARWINIA, Rudge.

Calyx cylindrical, *lobes 5, subulate, entire*, flowers in heads. HOMORANTHUS, A. Cunn.

Calyx cylindrical, lobes 5-10 digitately *divided*, flowers nodding, *not in heads.* RYLSTONEA, g.n.

Calyx *hemispherical*, lobes 5 or *10 deeply divided into subulate plumose or hair-like processes, flowers in corymbose heads.* VERTICORDIA, DC.

In Bentham and Hooker's Genera Plantarum, Vol. iii., p. 692, the three genera *Darwinia*, *Homoranthus*, and *Verticordia*, of Rudge, Cunningham, and De Candolle respectively, are kept distinct, as in Bentham's Flora Australiensis, although Baron von Mueller, in his Second Census of Australian Plants, has synonymised *Homoranthus* under *Darwinia*.

Speaking generally, *Darwinia* is distinguished from *Homoranthus* by its broad, entire calyx-lobes, the latter genus having subulate entire lobes. There are of course some minor differences, but the two genera, although closely allied, are distinct, and I

think the systematist is justified in separating them. The gradation of generic characters between the former genus and the latter is much more marked than between the latter and the genus *Verticordia*. One of the characters wanting in this hiatus will be found, I think, in the new genus.

The most constant character of this plant is its nodding, pedunculate cluster of two flowers. A sub-section of *Darwinia* has some of the flowers nodding, but the calyx-lobes and pedicels differ from those of the species now described.

Another character which distinguishes it from the three genera above mentioned is that the flowers are not crowded in heads as in *Darwinia* and *Homoranthus*, nor in corymbs as in *Verticordia*.

It is allied to *Darwinia* and *Homoranthus* by its calyx and anthers, but differs from them in its calyx-lobes as above mentioned, and also by its few pedicellate flowers.

It differs from the two sections of *Verticordia* mentioned by Bentham (B.Fl. Vol. iii.), principally in the shape of its anthers, as well as in other minor points.

The bracteoles are not thick or scarious as in its congeners, nor are they keeled as in *Darwinia*; they are folded well over each other and are rather persistent.

Melbourne, I have had the opportunity of comparing the latter with a large number of species of the former, and the difference is quite marked.

The pedunculate, pedicellate inflorescence is very characteristic, and the two pedicellate flowers have, I believe, no parallel amongst the species of the cognate genera.

Homoranthus has rarely, if ever, only two flowers, and then these are not pedicellate nor pedunculate.

The distinct exsertion of the style is a character which allies it more with *Darwinia* than with the other two genera.

Of all the Verticordias it is perhaps more closely related to *V. Wilhelmi*, F.v.M., than any of the others, and this is the first species of that genus, so that *Rylstonea*, having calyx and anthers similar to those of *Darwinia* and *Homoranthus*, and calyx-lobes and placenta of *Verticordia*, I place it in botanical sequence between this latter genus and *Homoranthus*.

EXPLANATION OF PLATE.

Fig. 1.—Twig with inflorescence.
Fig. 2.—Bud.
Fig. 3.—Bud with bracts forced back.
Fig. 4.—Individual flower.
Fig. 5.—Section of flower showing disposition of stamens, staminodia and ovules.
Fig. 6.—Peltate placenta.
Fig. 7.—Stamen with staminodia.
Fig. 8.—Stamen.

NOTES FROM THE BOTANIC GARDENS, SYDNEY.

No. 3.

By J. H. Maiden and E. Betche.

(Plate xxviii.)

TILIACEÆ.

ELÆOCARPUS LONGIFOLIUS, *C. Moore*, in Moore and Betche's Handbook of the Flora of New South Wales, 1893.*

(Syn. *E. Bäuerlenii*, Maiden and Baker, Proc. Linn. Soc. N.S.W. [2], x. 469, 1895, with a plate: *E. Kirtoni*, F.v.M., MS. (Bailey in Syn. Queensland Flora, 1st Suppl. p. 8: Maiden, Useful Native Plants, p. 423); *E. reticulatus*, Sm., var. *Kirtoni*, F.v.M.)

Mr. Kirton, of Bulli, N.S.W., sent this plant to Baron von Mueller in 1885; the latter described it in MS. as *E. Kirtoni*, but did not publish it, we believe: at all events it never appeared in his *Census*.

The Melbourne Herbarium also contains specimens collected

If the tree be considered a good species (as we think it is), Moore's name, having priority, must stand.*

There are those, however, who may follow Mueller in making all the forms varieties of *E. reticulatus*, Sm., (*E. cyaneus*, Ait.).

We would, however, point out that the leaves of *E. reticulatus* are narrowed into the petiole, while those of *E. longifolius* are obtuse or rounded. In *E. reticulatus* the venation is more prominent than in *E. longifolius*. In *E. reticulatus* the fruits are Prussian-blue in colour; in *E. longifolius* they are dull dark green. See also Maiden and Baker, *loc. cit.*

Kirton's specimens came from the Illawarra, Moore's from the Gosford district, and Bäuerlen's (*E. Bäuerleni*) from the Richmond River. It is not surprising that specimens gathered over so wide a range should show variation; whether it is desirable to name, as a variety, any of these forms is a matter for subsequent consideration.

RUTACEÆ.

BORONIA LEDIFOLIA, *J. Gay*, var. GLABRA, var.nov.

In general appearance and size much like the common form of the coast district and Dividing Range, but differing from the typical form in the entire absence of the white tomentum on the underside of the leaves. If the growing plant be touched, the very rancid odour at once arrests attention, being very much more marked than in the case of the normal species from the coast and mountain districts.

Harvey Ranges, near Peak Hill, N.S.W. (J. H. Maiden, September, 1898).

PHEBALIUM NOTTII, *F.v.M.*—Originally described from specimens collected in the Newcastle Range, Queensland, about 18° South, and now found in New South Wales in 32° South. Of

* Unless Bailey's description *loc. cit.* (1886) of a Queensland tree called by him *E. Kirtonii*, F.v.M., a species never, however, described by the author himself, can cause *E. Kirtonii* to take priority. It could surely, however, never be admitted that one author may publish for another, in that other's name.

intermediate localities only that of Expedition Range, Queensland, is known to us, though probably it will be found in the dry western spurs of the Great Dividing Range after a thorough botanical exploration of the colony. The Harvey Range specimens do not attain more than 3ft. in height, as far as seen, while the Expedition Range specimens are described as 10ft. high: furthermore they differ from the original description (F.v.M. *Fragm.* vi. p. 22) in the rather smaller and narrower leaves, the longer pedicels, and the flowers being generally 5-merous. Mueller describes the calyx-lobes, petals and ovarium-cells as six or seven in number, but to judge from the single small original specimen now in the Melbourne Herbarium, he had only scanty material at his disposal and may have described the flowers from abnormal specimens. It is a most profuse flowerer, and the large size of the flowers combined with the unusual colour (a deep mauve or light purple) render it a most desirable plant for cultivation.

Harvey Ranges, near Peak Hill, N.S.W. (J. H. Maiden, September, 1898).

EPACRIDEÆ.

RUPICOLA,* gen nov.

Calyx consisting of five sepals. Corolla normally 5-cleft, with a very short tube and with spreading segments, quinquefarious

R. SPRENGELIOIDES, n.sp.

An erect shrub attaining above 5ft. in height, with virgate slightly pubescent branches. Leaves crowded, erect or somewhat spreading, rigid, very shortly petiolate, linear-lanceolate, slightly concave, the longest 1¼ inches long and scarcely 1½ lines broad, tapering to a rigid though obtuse point. Flowers in the axils of the leaves, on peduncles about 4 to 5 lines long. Sepals narrow, rather acute, tapering from a broad base, about 2 or occasionally 3 lines long. Corolla white, very open, broadly campanulate or almost rotate, occasionally 6- or even 7-lobed, the tube about 1 line long, the lobes ovate-lanceolate, rather acute, about three times as long as the tube. Filaments flat in the adnate upper part, tapering towards the base; anthers about as long as the filaments, the terminal slit extending scarcely half way down, leaving the longitudinal dissepiment in the lower part of the anther. Style about half as long again as the anthers, but scarcely longer than the corolla; stigma small and truncate.

Southern edge of King's Table-land, Blue Mountains, N.S.W. Not rare on the sandstone cliffs descending into the Cox River or Burragorang Valley (J. H. Maiden and W. Forsyth, October, 1898).

The true position of the genus in the system is a matter of doubt to us. In its adnate and two-celled anthers, it approaches the curious Tasmanian genus *Prionotes* alone, but differs widely from it in every other respect; in the shape of the corolla, connivent anthers and absence of hypognous scales it much resembles *Sprengelia*, but the foliage is totally different; in general appearance it strikingly resembles the Tasmanian *Epacris mucronulata*, R.Br., but the resemblance is confined to the foliage and long peduncles. Though foliage is generally of little systematic value, all systematists agree in dividing the tribe Epacreæ into three natural groups according to the base of the leaves; following these accepted systems we have to place it next to *Epacris*, though with this genus it has only the æstivation of the corolla in common, besides the foliage and bracts.

PROTEACEÆ.

GREVILLEA JUNIPERINA, *R.Br.*, var. TRINERVATA, var. nov.—Leaves narrow-lanceolate, about 6 to 9 lines long, trinerved. Flowers creamy-yellow without any tinge of red.

Barber's Creek, N.S.W. (J. H. Maiden, October, 1898).

R. Brown's *G. juniperina* and *trinervis* are very closely allied as already observed by Bentham in the *Flora Australiensis*, and the present specimens make it very doubtful whether the specific distinction can be upheld. In *G. trinervis* the leaves are very variable, but the colour of the flowers as hitherto noted has been uniformly red; in *G. juniperina* the colour of the flower varies, but the leaves have hitherto been found uniformly linear-subulate.

The Barber's Creek specimens have the flowers of *G. juniperina* and the foliage of the short- and broad-leaved New England forms of *G. trinervis*.

EUPHORBIACEÆ.

RICINOCARPUS BOWMANNI, *F.v.M.*, var. ALBUS, var. nov.

Flowers white; the males mostly solitary, only occasionally in clusters of two or three.

Bomera, New England (W. MacDonald, October, 1898).

Mr. J. B. Garland informs us that he has seen a white flower.

Zealand and Australian specimens, and contrasted with the true *P. obtusifolius*.

P. ochreatus, Raoul.

Stem slender, terete or somewhat flattened, the leaves spread, a little branched, internodes longer.

Leaves sessile, sometimes suddenly narrowing at the base, but most often half amplexicaul, obtuse or a little acuminate, without point.

Midrib broad, with many fine longitudinal nerves on each side.

*Ligule** acuminate and thus more narrow at the top than at the base; more constant.

Fruit with distinct edges and most prominent beak.

Beak long, much recurved, *the stigma* not flattened.

Spike 1 and 1½ inches long, *slender*, cylindrical, interrupted, *not* very dense.

Peduncles 2-3 times longer than the spike, thicker than the stem.

P. obtusifolius, Mert., & Koch.

Stem compressed, with rough rounded edges, very much branched.

Leaves sessile, *all* more or less narrowing at the base, *none* amplexicaul, with two distinct and often reddish-coloured glands at the base, with one, sometimes two, distinct nerves on each side of the *midrib*, but far distant from it, near the edge; no intermediate fine longitudinal nerves.

Ligule broader at the top than at the base, and thus infundibuliform or cup-formed, very deciduous without changing in fibres.

Fruit nearly without edges, slightly keeled, oblique, elliptic.

Beak short, with flattened *stigma*.

Fruit-bearing spike ½-1 inch long, thick, cylindrical, and *very dense*, compact, not interrupted.

Peduncles of the same length or shorter than the spike, the same thickness as the stem or thinner.

* Stipule of Bentham.

Search alone will settle the question as to whether *P. obtusifolius*, M. and K., will yet be found in Australia, but, so far, all the Australian specimens received by Herr Baagoe under this name belong to *P. ochreatus*, Raoul. (See also A. Bennett, *Journal of Botany*, xxv. 178).

Bentham (*Flora Australiensis*, vii. 173) is mistaken in considering *P. ochreatus*, Raoul, as synonymous with the *P. obtusifolius*, M. and K.

Herr Baagoe writes:—"When Hooker considers *P. ochreatus*, Raoul, as synonymous with *P. compressus*, L., this is a mistake, and if you consider *P. compressus* as synonymous with *P. obtusifolius*, M. and K., this is scarcely correct.

"But *P. ochreatus* comes rather near to the European *P. zosterifolius*, Schum., though it is easily separated from this by the latter's much-winged stem, shorter fruit-spike and very broad stigma.

"*P. ochreatus*, Raoul, is synonymous with *P. gramineus*, R.Br., (Prodrom. 373).

"*P. compressus*, Linn., is synonymous with *P. zosterifolius*, Schum., (Enum. plantar. Sael.); *P. zosterophyllus*, (Fl. Belg.).

"*P. obtusifolius*, M. and K., is synonymous with *P. compressus*, Wahl.; *P. gramineus*, (Fl. Brit. i. 196); *P. tataricus*, Less.,

OBSERVATIONS ON THE EUCALYPTS OF NEW SOUTH WALES.

Part IV.

By Henry Deane, M.A., F.L.S., and J. H. Maiden, F.L.S.

(Plates xxix.-xxxiii.)

Eucalyptus piperita, Sm.

Vernacular names.—"Peppermint" is its usual name about Port Jackson and in some other districts. It goes by the name of "Messmate" in some other parts of the colony. It has been called "Almond-leaved Stringybark" and sometimes "White Stringybark." Through confusion with *E. pilularis* (to which it is often not dissimilar in general appearance) it is sometimes known as "Blackbutt," but such names as Stringybark and Blackbutt as applied to this species should be discouraged.

operculum is markedly pale-coloured in this species; this is accentuated in dried specimens.

Fruit.—The fruits may be arranged under three forms, which pass into one another:—

(*a*) Urceolate.
(*b*) Egg-shaped.
(*c*) Nearly spherical, open-mouthed.

(*a*) Urceolate.—This is the commonest Port Jackson form and must, we think, be regarded as the type. It is probably the form corresponding to the leaves secured by White. The variety is found in the Blue Mountains, Goulburn, Braidwood, Moruya, and throughout the range of the species generally.

(*b*) Egg-shaped.—The range of this form is probably co-extensive with the species. We have egg-shaped fruits from Port Jackson, the Blue Mountains and the Mudgee district, and south to Thirlmere, Picton to Bargo and Ulladulla.

(*c*) Nearly spherical.—These occur at Manly, Port Jackson, and some other places elsewhere in this colony. Some of Mr. Howitt's Gippsland specimens in our opinion also fall under this group. The fruits are very small, not exceeding 2 lines in diameter.

This form may readily be confused with *E. amygdalina* var. *radiata* if individual fruits be alone examined, but the leaves of the latter are much narrower, are thinner, duller, full of oil-dots (the leaves reek with oil) and the twigs are rusty-tuberculate.

We have been favoured by Mr. J. G. Luehmann with a view of specimens of *E. piperita* collected by Robert Brown, Iter Australiense, 1802-5 (distributed by J. J. Bennett, British Museum, in 1876). The specimens are stated to be from Port Jackson (? by Brown), but we would point out that in the early days collections marked Port Jackson frequently came from considerable distances north, south and west of that estuary. Robert Brown's specimens have fruits most of which come under our group (*c*); at the same time others approach (*b*) in shape.

In the *Flora Australiensis*, iii. p. 207, we find mentioned var. *laxiflora*, Benth. "Pedicels rather long. Fruit more obovoid,

the rim more depressed. Manly Beach, Twofold Bay, Camden, Macleay and Clarence." We have been trying to ascertain what this so-called variety really is. No specimens are so labelled in the Melbourne National Herbarium, although the latter contains specimens from the Macleay and Clarence. These we refer to (*infra*, p. 786). Specimens from the other localities mentioned do not, in our opinion, answer satisfactorily to Bentham's brief description, and the name might well be disregarded.

In 1879 Mr. A. W. Howitt sent to Baron von Mueller from Walhalla, Gippsland, specimens with the following note: "Tree locally known as Stringybark; the specimen is taken from a tree split for palings, and I am informed that the wood is sound and durable and both saws and splits well." The Baron labelled these specimens "*E. eugenioides*, Sieb.," and also "*E. piperita*, Sm., var. *eugenioides*." Some identical specimens sent by Mr. Howitt from the Tambo River were labelled by the Baron "*E. eugenioides*, Sieb.," and he adds, "To this the specific name *E. pilularis* would well apply."

E. piperita and *E. eugenioides*.—In the *Flora Australiensis* *E. eugenoides* is reduced to a variety of *E. piperita*, and even in the *Eucalyptographia* the Baron almost expresses doubts as to

branches covered with fibrous outside grey and rough bark," and he mentions as one of the means of distinguishing it from *E. pilularis* "its rough bark extending to the branches (Pachyphloiæ)," whereas the typical *E. piperita* is only a "half barked" tree like *E. pilularis*.

Howitt in his "Eucalypts of Gippsland" (*Trans. R.S. Vict.* Vol. ii. Part 1, p. 87) speaks of the "near alliance" of the two species. Speaking generally, the two species are very distinct and are not to be mistaken one for the other. They differ markedly in their seedlings, in the venation of the mature leaves and in the odour of the same in their bark and timbers.

Howitt has figured a number of fruits at Plate 13 which he attributes to *E. piperita*, viz., Nos. 6-19, Nos. 20 and 21 being referred to *E. eugenioides*. We are of opinion that Nos. 6 to 9 are properly referred to *E. piperita;* as regards the remainder, we would suggest that they probably belong to *E. eugenioides*. We would also invite attention to Mr. Howitt's excellent drawings of seedlings on Plate 14. Nos. 1 and 4 seem to us both to belong to identical species, viz., *E. eugenioides*.

It does not appear to us that Howitt has quite grasped the distinction between *E. piperita* and *E. eugenioides*, which opinion is strengthened by a consideration of the apparent confusion existing in the mind of Baron von Mueller when writing the descriptions of the two species in the *Eucalyptographia*. Nevertheless the southern examples especially do present some difficulties, and there is a form of somewhat wide distribution which we shall now refer to which, if not a connecting link, shows at any rate affinity to both species, and it may have been a predominance of such a form which led to so much confusion.

The intermediate form to which we refer may be briefly indicated as follows:—Bark fibrous, not so fibrous as that of a typical Stringybark, and perhaps little more fibrous than that of the ordinary *E. piperita*. The fruits nearly globular and showing a mottled appearance, due to unequal shrinkage of the outer layers of cells of the fruit. The orifice is small, the rim depressed and not very prominent. The specimens, which are from Port

Jackson, precisely match some labelled in Baron von Mueller's handwriting "Stringybark, *E. piperita*, Twofold Bay." The fruits figured in the *Eucalyptographia* are not very dissimilar to them. They have short pedicels and are frequently sessile. We cannot ascertain that this form has been named as a variety. The tree appears to us to partake of some of the characters of both *E. piperita* and *E. eugenioides*. The Port Jackson-Twofold Bay specimens may for convenience be referred to as A. The texture of the leaves of A and the prominence of the veins are intermediate between *E. piperita* and *E. eugenioides*, as is also the amount of essential oil so characteristic of *E. piperita*. The fruits of *E. piperita* have a very thin rim, in A it is a little broader, in *E. eugenioides* it is well defined. The size of the orifice of A is intermediate between the two species named. The shape of the fruits of A is less ovoid than those of *E. piperita*, and less hemispherical than those of *E. eugenioides*.

Since the above was written Mr. J. G. Luehmann, Curator of the Melbourne National Herbarium, has favoured us with some specimens collected by Mr. A. W. Howitt in Gippsland. Follow-

Range.—North and south coast districts as far north as the Myall Lakes, but the northern limit is uncertain. At Bulladeelah there are many large trees of this species, consequently it is not likely that this place represents its northern boundary.

We have not seen any indubitable *E. piperita* from Queensland.

We have seen plants in the Melbourne Herbarium from the Macleay and Clarence Rivers attributed to *E. piperita*, but they have no fruits and we think the determination is doubtful.

It is found on the Dividing Range and its spurs, being especially plentiful on the Blue Mountains. It is found west at least as far as Mudgee.

The typical form is found at least as far south as Moruya, but trees which are considered to belong to this species occur, as already indicated, as far south as Gippsland.

EUCALYPTUS PILULARIS, Sm.

Vernacular names.—The name "Blackbutt" is of obvious meaning, but sometimes the depth of tint is intensified by bush

Size.—It is one of the largest of our Eucalypts, and giant trees have been recorded over the greater portion of the area in which it abounds.

A tree at Bulli was measured by one of us in 1891 with the following results:—Girth at ground, measuring from buttress to buttress, 57ft. 6in. The girth at 3ft. from the ground was 45ft. and at 6ft. above the ground 40ft. The taper was then very gradual for about 90 feet (estimated), when the head is broken off. There are ten principal buttresses, of an average diameter of over 2 feet, but they practically cease to flute the trunk at a height of 10 to 15 feet.

Mature leaves.—They are often hooked at the tips and sometimes the leaves are glossy. Usually there is no marked difference in the glossiness of the two sides. There are, however, more stomata on the lower side. It would appear that the leaves of southern trees are usually smaller than those from other parts of the colony. The venation is more prominent on the under surface of the leaf. This character, which appears to be almost confined to coast species, is shared by *E. acmenoides*, *E. microcorys* of the *Renantheræ*, and *E. saligna*, *E. resinifera* and several others of the *Parallelantheræ*. The veins are parallel and, unlike most *Renantheræ*, make a considerable angle with the midrib.

Petiole.—Broadish and flattened. Mueller (*Eucalyptographia*) lays emphasis on the flatness of the flower-stalks, but this character belongs to many other species, to some to a greater extent than to *E. pilularis*.

Operculum.—Pointed, even acuminate; sometimes so long as to remind one of that of *E. tereticornis*.

Stamens.—Filaments usually turn red. The dark colour of the stamens has already been referred to in B.Fl. iii. 208. They are, however, not noticed in fresh specimens, but the colour deepens with age.

Fruit.—The fruits vary in size from $\frac{3}{8}$ inch to $\frac{1}{2}$ inch in diameter, and also in the size of the opening.

1. In some trees the fruits are large, $\frac{7}{16}$ inch in diameter and nearly spherical, with but a small opening and a scarcely distinct

rim. This may be taken to be the typical form which led to the adoption of the specific name: it occurs mainly in the Sydney district, not being found much north of Port Jackson and perhaps within a hundred miles to the south.

2. Trees with smaller fruits occur from the Hastings to the Moruya Rivers, and probably along the whole range of the species.

3. In others the fruit has a very large opening, and has a truncate appearance: the rim is comparatively wide. Fruits of this shape occur in Northern New England, on the Hastings, Seaview Range and south to Moruya: probably also throughout the whole range of the species. Bentham refers to this form when at B.Fl. p. 190, giving a specific character for *E. pilularis*, he states: "Fruit rim usually broad and flat." It is the one figured in the *Eucalyptographia*, and the Baron remarks "the systematic name for this species is not happily chosen." Again *(loc. cit.)* "Whereas the globular fruit of *E. pilularis*, as aptly

Valves.—The valves are sometimes exserted in the broad-rimmed forms. We have fruits from Sydney, Kempsey and Tenterfield which show this well.

Range.—Extending into Queensland on the north and to Moruya on the south, from the coast up the slopes and spurs of the Dividing Range to the Table Land, but apparently not found more than about 100 miles from the coast and scarcely crossing on to the western slope at any place.

We have specimens from the National Park, 20 miles south of Sydney, collected by Mr. Julius Camfield, with the inflorescence in a dense raceme and the fruits large and ovoid, showing, in the latter respect, an approximation to *E. piperita*. The operculum is not as long as that of *E. pilularis* usually is, and the filaments are white although they have been collected for a considerable period. These specimens afford additional evidence of the variability of *E. pilularis*

In northern New England there is a form of *E. pilularis* the fruits of which are likely to be confused with those of the local Stringybark (a large-fruited *E. eugenioides* verging toward *E. capitellata*). In the latter, however, they are more depressed, have the rim less flat and the valves less prominent, while the buds are angular.

E. ACMENOIDES, Sieb.

Syn. *E. triantha*, Link.

There are two forms:—(*a*) The typical one. (*b*) A stout and coarse one which occurs at no great distance from the sea.

Vernacular names.—"White Mahogany," but often erroneously called "Stringybark" because of the similarity in appearance of this species (particularly when young) to Stringybark.

Bark.—Fibrous, not unlike Stringybark in smallish trees; but more like Tallowwood bark (*E. microcorys*) in large trees. The branches are covered as well as the trunk. We would draw attention to the absence of kino in this species. Though we have been on the lookout for it for many years, we have never found a piece much larger than a pin head.

We do not doubt that a good deal of country reported to be Stringybark is really White Mahogany. Both species like the same situations—well drained, sterile hills and mountain sides.

Timber.—Pale-coloured, dense, and of high specific gravity.

Sucker leaves.—The first leaves are opposite and not oblique, but symmetrical, broadly ovate, lanceolate. As the plant grows older they become alternate and are acuminate. The leaves of the coast form are coarse and large, the dimensions of some before us being 2½ to 3 inches broad and 6 inches long.

In the mature leaves there is a tendency to crenulate margins, and some show a considerable resemblance in outline to that of a peach. The leaves are less oblique than in most Eucalypts, and the veins, unlike most *Renantheræ*, are parallel, making a considerable angle with the midrib, and are thus very distinct from those of *E. eugenioides*. The twigs are angular.

Buds.—When in a young state, from coast districts, often angular, like *E. capitellata*. The species is often a very profuse flowerer.

Pedicels flattened.

Fruit.—(*a*) The ordinary form in coastal districts at some distance and elevation from the sea. It is not altogether unlike that of *E. eugenioides*, but is flat at the top with sometimes a thin rim.

(*b*) Fruits larger and coarser, hemispherical, truncate and with a broad rim. The rim is well defined and usually dark-coloured.

A form from Parramatta has fruits which might very readily be casually taken for *E. pilularis*. They differ from those of normal *E. pilularis* in being smaller, the rim not defined, and the valves approaching the orifice.

Fruiting twigs of the coast form of *E. acmenoides* may not unreasonably be mistaken for *E. Bosistoana*, F.v.M. The valves of the latter are more numerous than is the case with *E. acmenoides*; the valves of *E. Bosistoana* also are usually a little exserted. *E. Bosistoana* belongs to the Box Group, so that the two trees could not readily be confused in the forest.

The possibility of *E. eugenioides* being confused with *E. acmenoides* has already been referred to.

We have seen a form with brown shining fruits which present a good deal of resemblance in outline to some fruits of *E. melliodora*. This is worthy of notice, though the two species are otherwise very dissimilar

Range.—Coast districts Central New South Wales to Central Queensland. Occurs in the ranges up to a distance of less than a hundred miles from the coast.

We have not observed it south of Parramatta.

E. Sieberiana, F.v.M.

The species referred to as *E. virgata*, Sieb. (B.Fl. iii. 202) in part. We would suggest consideration of our remarks on this subject in Part iii. of our series (Proc. Linn. Soc. N.S.W. ii, 717).

Vernacular names.—"Mountain Ash" is its usual name. It attains its greatest luxuriance in mountain districts and its timber is thought to resemble Ash. Sometimes called "Black Ash," but this name should be reserved for *E. stellulata*. In Tasmania and at Wilson's Promontory, Victoria, it is sometimes called "Gum-top" or Gum-top Stringybark (in allusion to the smoothness of the tops of the branches) and White-top Ironbark in Tasmania, where there are no true Ironbarks. It has been also called Blackbutt, but that name should be reserved for *E. pilularis*. It was called "Yowut" in the Gippsland district, according to Howitt. It has been called "Messmate" or

"Stringybark" at the Dromedary N.S.W., but the use of such names for this species is to be deprecated.

Bark.—In young trees the bark often somewhat resembles "stringybark" when viewed from a little distance. Hence the tree has been sometimes called Stringybark with a qualifying adjective. In older trees the bark becomes denser, darker coloured, more furrowed and rugged in character. The casual observer might be excused if he took the tree for an "Ironbark," but a closer examination would show the bark to be neither dense nor tough enough. The small branches are smooth.

The smooth bark of saplings appears always to be glaucous.

Timber.—Pale-coloured and fissile, less variable perhaps than that of most of the Eucalypts. Very suitable for inside work, but not durable when not protected from the weather.

Seedling leaves.—Opposite in the first stage, soon becoming alternate, elliptical in shape and soon becoming shortly pointed. The sucker leaves similar in character. Seedling and sucker leaves are glaucous, dull-coloured on drying and have the veins more spreading than is the case in the mature foliage.

Mature leaves.—The leaves are often smooth, shining and coriaceous.

We observed a narrow-leaved form both at the Sugarloaf Mountain (Braidwood) and at the Dromedary. Tasmanian specimens appear to have longer, narrower and more falcate leaves. There is a broad-leaved and very glaucous form in the Snowy Mountains.

Fruits.—Pear-shaped, usually a little oblique, the rim sometimes slightly concave, particularly when ripe. Edge of rim frequently sharp. Sometimes the plane of the rim is not at right angles to the axis of the fruit. Shining. The rim usually well defined and often dark as in *E. hæmastoma.*

The fruit is more hemispherical in Tasmanian specimens.

Apparently the fruits attain their largest size on the Blue Mountains. It would appear that the fruits of *E. Sieberiana* from New South Wales are usually more pear-shaped and larger than those represented in the *Eucalyptographia.*

Range.—Tasmania, Victoria, and in our own colony, chiefly the coast districts. It, however, occurs in the Snowy Mountains (near the Victorian border) at an elevation of 4-5000 feet, and thence northward along the ranges, west at least as far as Mudgee. Mr. A. R. Crawford, of Walcha, (a valued correspondent) states that it occurs in New England, and knowing his experience in such matters we attach weight to his statement, but his specimens have miscarried and it has not been convenient to him to replace them, as they were procured 40 miles from his home.

On the Snowy Mountains it is interesting to observe that *E. Sieberiana* is always found on slopes with a southern aspect.

The species loves high, rocky, stony mountain ranges on poor barren ground, and never takes to grassy localities.

We have a specimen of "Mountain Ash" marked as being collected by Mr. W. S. Campbell near Molong; the timber is not dissimilar to that of normal *E. Sieberiana;* the venation of the leaves has the character of *E. hæmastoma* or *E. Sieberiana*, but the fruits (we have neither buds nor flowers at present) are almost spherical, being truncate at the top.

Mueller, in *Eucalyptographia*, speaking of *E. Sieberiana* and *E. hæmastoma*, states that "the stem bark of the former is far more ridged than that of the latter, the veins of the leaves of *E. Sieberiana* are less spreading and less prominent, while the fruit is usually longer, more exactly semiovate and never verging towards an hemispheric form." In regard to these statements

we would observe that *E. hæmastoma* is a smooth-barked tree, and that those rough-barked trees which were thought to show some transition towards *E. Sieberiana* (as well as to other species) have since been shown to belong to other species.

The Sydney form is often confused with *E. hæmastoma*, as the young trees often have the appearance of white gum if the butts be not carefully examined.

If *E. Sieberiana* leaves be crushed in the warm hand they evolve a slight odour of peppermint which is not observable in *E. hæmastoma*.

In the *Flora Australiensis* Bentham also draws attention to the affinity between *E. Sieberiana* and *E. hæmastoma*, and lays some stress on the differences between their anthers. We are of opinion that it is difficult, and perhaps impossible, in the present state of our knowledge, to distinguish the two species by means of their anthers.

As regards the shape of the fruit, our specimens of *E. Sieberiana*, reputedly from Molong, those of Mr. Howitt from Gippsland, and some from Tasmania (L. Rodway) distinctly are almost hemispheric in form, but they are very distinct from those of *E. hæmastoma*.

E. coriacea.—Both Bentham and Mueller compare *E. Sieberiana* and *E. coriacea*. The closest similarity appears to be in the shape of the fruits. For fruits of *E. coriacea* see Proc. this Soc. 1895, Pl. LIV., figs. 4-6. They are coarser and more fleshy than

Sieberiana. If not a distinct species it is undoubtedly a well-marked variety which extends unchanged over a considerable area, and for which we propose the provisional name of var. *Oxleyensis*

The possession of absolutely complete material may prove that it is worthy of specific rank.

It is the tree referred to in the following passage in Maiden's Dorrigo Report in *Agric. Gaz.*, Oct., 1894, p. 612 :—

"Less than 100 yards inside the brush of the Glenfernie Forest Reserve, and at least as far as Blick's River to Bald Hills, is a large tree, with brown, peppermint-like bark, which seems to be intermediate in character between *E. hæmastoma* and *E. Sieberiana*. The tree would appear to be very widely distributed in New England, for specimens collected by Mr. Henry Deane, at the Bluff River, near Tenterfield, cannot, in my opinion, be separated from my specimens. Of course the typical *E. Sieberiana*, with bark of the appearance of an ironbark, free-grained timber, and conoid fruits (with pedicels hardly separable from the fruits), is at once distinguishable from the smooth-barked *hæmastoma*, usually of crooked growth, inferior timber, and with the fruit having a tendency to a hemisphere, leaving a distinct pedicel. But my specimens seem to be intermediate in character. The peppermint-like (*E. piperita*) bark is very different in appearance to that of the true *E. Sieberiana*, and while the veins of the leaves of *E. Sieberiana* are usually less conspicuous than those of *E. hæmastoma*, I cannot satisfy myself to bring the leaves of my plants into one species rather than into the other. To sum up, having considered the fruits, leaves, barks, and timbers, I can only observe that my particular New England specimens (called by the few local residents 'messmate' and 'peppermint' indiscriminately), must for the present be looked upon as a connecting-link between *E. hæmastoma* and *E. Sieberiana*."

It is the tree referred to under *E. Sieberiana* in the *Proc.* of this Soc. for 1898, p. 27.

Similarities to E. Sieberiana.—Has every appearance as regards buds, flowers and fruits, of a slender form of *E. Sieberiana*.

Dissimilarities to E. Sieberiana.—In bark and timber.

Vernacular names. — "Messmate" appears to be the local designation most generally in use, but it has been called Peppermint with reference to the appearance of the bark alone.

Bark.—Resembles that of *E. amygdalina* or *E. piperita*, more than that of *E. Sieberiana.* It is not furrowed like that of the latter species In fact it is not at all like *E. Sieberiana*, its bark being sometimes particularly fibrous. Only the smaller branches are smooth.

Timber.—Very different to that of *E. Sieberiana*, being of a deep brown colour. At the same time it is a duller-looking timber, and is looser in the grain and not so long in the fibre as that of *E. Sieberiana.*

Fruits.—Much smaller and more slender than those of *E. Sieberiana.* In some cases the pedicels are much slenderer and the calyx-tube more rounded at the base than in others. Such fruits bear some resemblance to those of *E. hæmastoma*, var. *micrantha*, but the smooth bark of the latter tree at once establishes a difference between the plants.

Leaves.—The sucker leaves do not appear to be dissimilar to those of *E. Sieberiana.* As regards the mature leaves, they are often long and narrow, leaves that are 6 inches in length being commonly not more than five-eighths of an inch in width.

Size.—Four or five feet in diameter and 100 feet high as seen.

Range.—Northern New England (Tenterfield district); the

species, and we are not aware that it has been recorded from further south than Camden Haven. It extends along the coast as far as Queensland. At Camden Haven it is found over an area of about a mile by half a mile broad, and is locally known as Stringybark, but it is more like Red Mahogany. The bark is rough to the ultimate branchlets. The trees are poor and pipy; a solid one could not be found. Their height goes up to (say) 30 feet, with a diameter of 15 inches, but the trees are of stunted growth and their occurrence is patchy. We have seen a fruit from Camden Haven $1\frac{1}{8}$ inch broad by 1 inch deep. Near Kempsy *E. Planchoniana* is a fine tree, resembling *E. robusta* in bark, and attaining a height of (say) 100 feet and a trunk diameter of 3 feet.

The following are some Notes which supplement those given on the species of Eucalyptus already dealt with by us:—

E. OBLIQUA, L'Herit.

[Previous reference, 1896, 803.]

Another Kew gardener, David Nelson, was Assistant Botanist during Cook's third voyage, 1776-1779. L'Heritier founded the famous genus *Eucalyptus* on *E. obliqua*, first found by Nelson in Van Diemen's Land, and introduced into cultivation by Captain Furneaux in 1774 (*Pharm. Journ.* 19th Decr., 1896, p. 531.)

The following letter is interesting, not only because it brings the recorded localities of the species some miles to the west, but because it embodies other experiences of a well-known observer:— "The Eucalypt mentioned by you (*E. obliqua*) is abundant here. In this locality it is found on poor stony ranges chiefly. It attains a great size, up to 8 or 9 feet or even more in diameter; such trees are usually short-stemmed. It is said it will not last as posts, but I have never been given satisfactory proof as to its unfitness. A mile or two of fence is erected; the posts are mixed, probably split from three or four different kinds of Stringybark. Then 12

or 15 years later, who can say which is best? Certainly not the average bushman. It is often, I know, too short to run into rails. I have seen trees that you could not run into 7 foot posts even if struck 6 inches thick. I split a tree of this species 85 feet in length of barrel by 2 feet in diameter; it flowered here last season in January, the trees being great masses of bloom, very noticeable, although distant on the ranges from one to two miles. It is known here as Woolly-butt, Woolly-bark, or White Stringybark" (A. R. Crawford, Moona Plains, Walcha, July, 1898).

E. DEXTROPINEA and E. LÆVOPINEA, Baker, in P.L.S.N.S.W., 1898, p. 414.

We have not had a sufficient opportunity of examining these trees, although we have been favoured with herbarium specimens by Mr. Baker, and therefore hesitate to pronounce any strong opinion as to their affinities. Mr. Baker places them both among the "Stringybarks." It seems, however, to us that *E. dextropinea* has some characters in common with *E. pilularis*, and we think it is a pity that the chemical products of that species had not been inquired into before naming the two new ones. We must, however, offer our protest against naming species after recondite properties which can only be recognised after close analysis in the laboratory.

E. STELLULATA, Sieb.

[Previous reference, Vol. (2) x. 596.]

E. AMYGDALINA, Labill, var. LATIFOLIA, Deane and Maiden.

[Previous reference (2) x. 609.]

Abundant on Black Range (Mt. Victoria to Jenolan Caves). It is common also in the Goulburn district.

E. REGNANS, F.v.M.

The giant tree at Mt. Tomah, which has been recently measured by one of us, is of this species. Diameter at ground, 17 feet, 6 inches; 3 feet up, 16 feet, 3 inches; height (estimated), 150 feet.

For some notes on *E. regnans*, see Proc. Aust. Assoc. Adv. Science, vii., 539.

E. EUGENIOIDES, Sieb., var. NANA, nobis.

[Previous reference, 1896, 803.]

In exposed situations in the Blue Mountains a dwarf, mallee-like growth of Eucalyptus grows. The species is mainly *E. stricta*, sometimes admixed with a little *E. stellulata*, var. *angustifolia* in swampy places. On the King's Tableland, Wentworth Falls, we found a form of *E. eugenioides* which bears a remarkable resemblance to *E. stricta*, and in reference to its dwarf habit we style it var. *nana*.

This is the first occasion in which we have found this species to form part of the dwarf gum-scrub in question.

It bears a strong resemblance to *E. stricta*, unless the inflorescence and fruits be examined; and we trust that the figures, aided by the following notes, will make the identity of this interesting plant quite clear:—

Sucker leaves.—Lower leaves almost cordate and very symmetrical. As growth proceeds they become ovoid and finally lanceolate. The lower cordate leaves about ¾ inch long by ½ inch broad.

Mature leaves.—Thicker, and, as a rule, more symmetrical than those of the normal species. Narrow, lanceolate, those 2 inches in length (which is the normal length) being usually ½ inch across. Some of the leaves are proportionately so narrow as to come within

[redacted]

Plate XXX.

E. pilularis, Sm.

Fig. 6.—Fruits of intermediate size, from Hawkesbury River.

Fig. 7.—Fruit of small form from Port Macquarie.

Fig. 8.—Ovoid fruits, National Park, Sydney, showing transition to *E. piperita*.

Fig. 9.—Fruits from Kogarah Bay, Sydney, showing narrow rim and exserted valves.

Fig. 10.—Fruits from Tenterfield district, showing broad rim and exserted valves.

Fig. 11.—Large-fruited, broad-rimmed form, from Dapto.

E. acmenoides, Schau.

Figs. 12-14.—Large and small sucker-leaves (from same twig); also mature leaf. All from Middle Harbour, Sydney, and from the coarse form of the species.

Plate XXXI.

E. acmenoides, Schau.

Fig. 15.—Fruits: (*a*) Manly, Sydney (coarse coast form); (*b*) Berowra, Hawkesbury (coarse coast form); (*c*) Mt. Seaview (slender inland form); (*d*) Tinonee, Manning River (slender inland form); (*e-f-g*) Woy Woy, Wyong, Stroud. The last three are forms intermediate between the coarse ones of the coast and the slender inland ones.

E. Sieberiana, F.v.M.

Fig. 16—Seedling leaf, Barber's Creek, N.S.W.

Fig. 17.—Sucker-leaf, Barber's Creek, N.S.W.

Fig. 18.—Mature leaf, showing spreading venation, Blue Mountains, N.S.W.

Plate XXXII.

E. Sieberiana, F.v.M.

Fig. 19.—Fruits: (*a*) Hill Top, Mittagong, N.S.W.; (*b*) Snowy Mountains, N.S.W.; (*c*) Mt. York, Blue Mountains; (*d*) Mt. Wilson.

E. Sieberiana, var. *Oxleyensis*, nobis.

Fig. 20.—A small narrow leaf.

Fig. 21.—Slender fruits (usual form in this variety), near Tenterfield.

Fig. 22.—Fruits more rounded at the base than is usual in this variety, Seaview Range.

Plate XXXIII.

E. eugenioides, Sieb., var. *nana*, nobis.

The Plate is mainly self-explanatory. The twig is part of a young sucker. The detached leaves are various stages and forms of sucker-leaves.

NOTES AND EXHIBITS.

Mr. Maiden exhibited herbarium specimens of the plants referred to in the papers by Messrs. Deane, Betche, and himself.

Mr. Etheridge exhibited the aboriginal weapons described in his paper.

Mr. Hedley contributed the following Note:—An interesting addition to the fauna of N.S. Wales is hereby recorded in *Liotia lodderæ*, Petterd, of which several specimens have occurred to me on Balmoral Beach, near Sydney. The species was described by Petterd in the Journal of Conchology, iv. 1884, p. 135, from the Leven Heads, Tasmania, and has since been found in South Australia and Victoria. Tryon omitted the species from his Monograph as unfigured, and therefore unrecognisable. To supply this defi-

Mr. Stead showed an admirably mounted series of preparations of *Neptunus pelagicus*, and its varieties, in illustration of his paper.

Mr. Baker exhibited herbarium specimens of the new plant described in his paper.

Mr. Ogilby exhibited a specimen of *Howella brodiei*, the unique type of a family, genus, and species.

Mr. Edgar R. Waite exhibited two examples of a Dung Beetle (*Aulacopris reichei*, White) he had obtained in the Yessabah Caves on the Macleay River. These caves are peopled with Bats whose droppings, from their roosting places, form large mounds upon the floor of the cave, at the base of which the beetles were found. Each had excavated a small hollow wherein the dung balls were deposited. One beetle was discovered with seven balls and the other with nine. On examining one of the series it was seen that while the ball at the time being formed contained an egg, others were in various stages of development, indicating that considerable time is absorbed in forming the whole series of balls.

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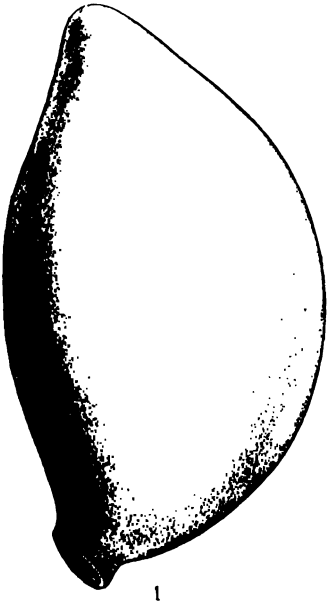
J.P. Eckert del.

CUPANIA HOWEANA.



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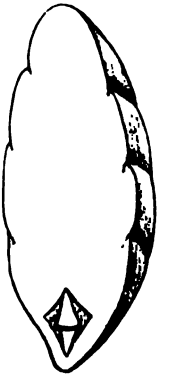

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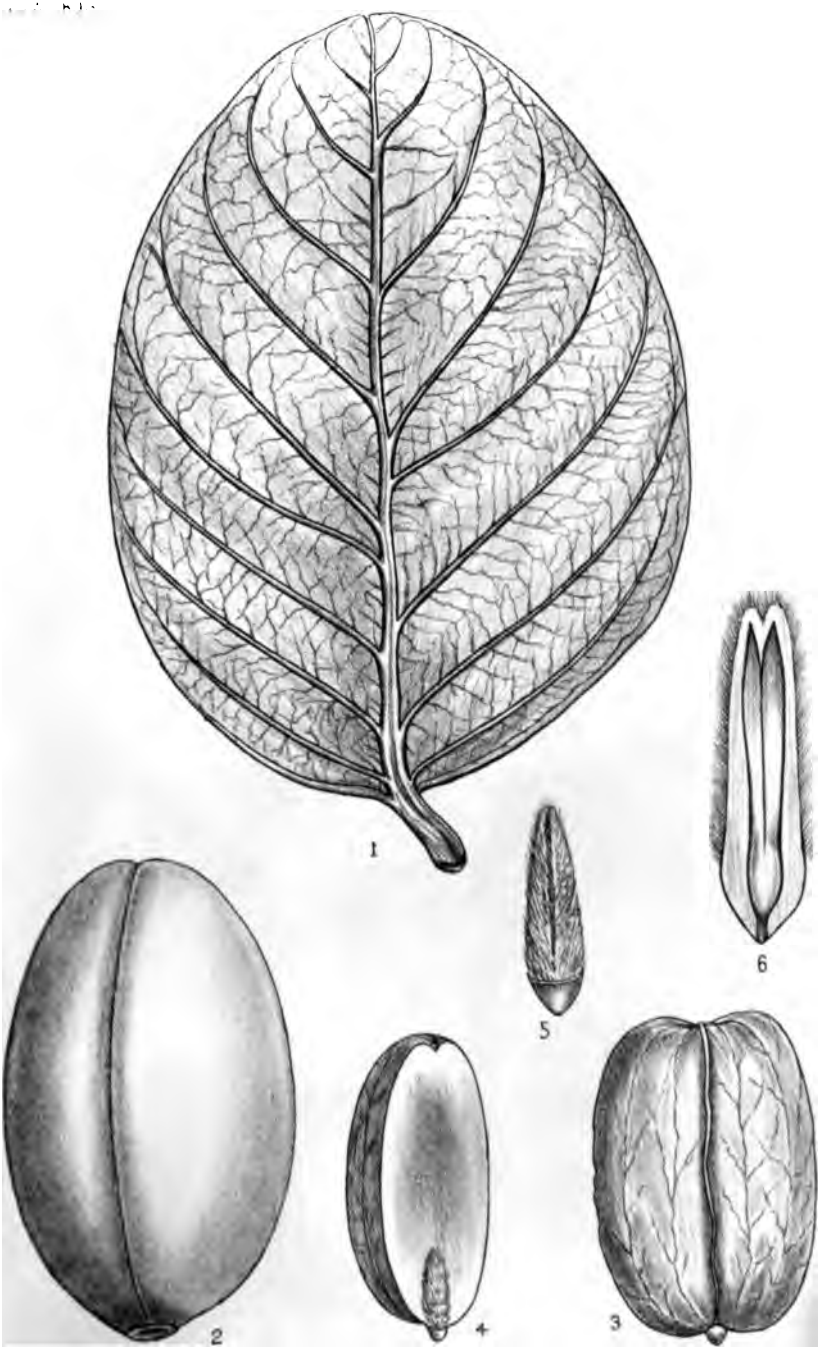
BLUE PLUM



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BLACK PLUM

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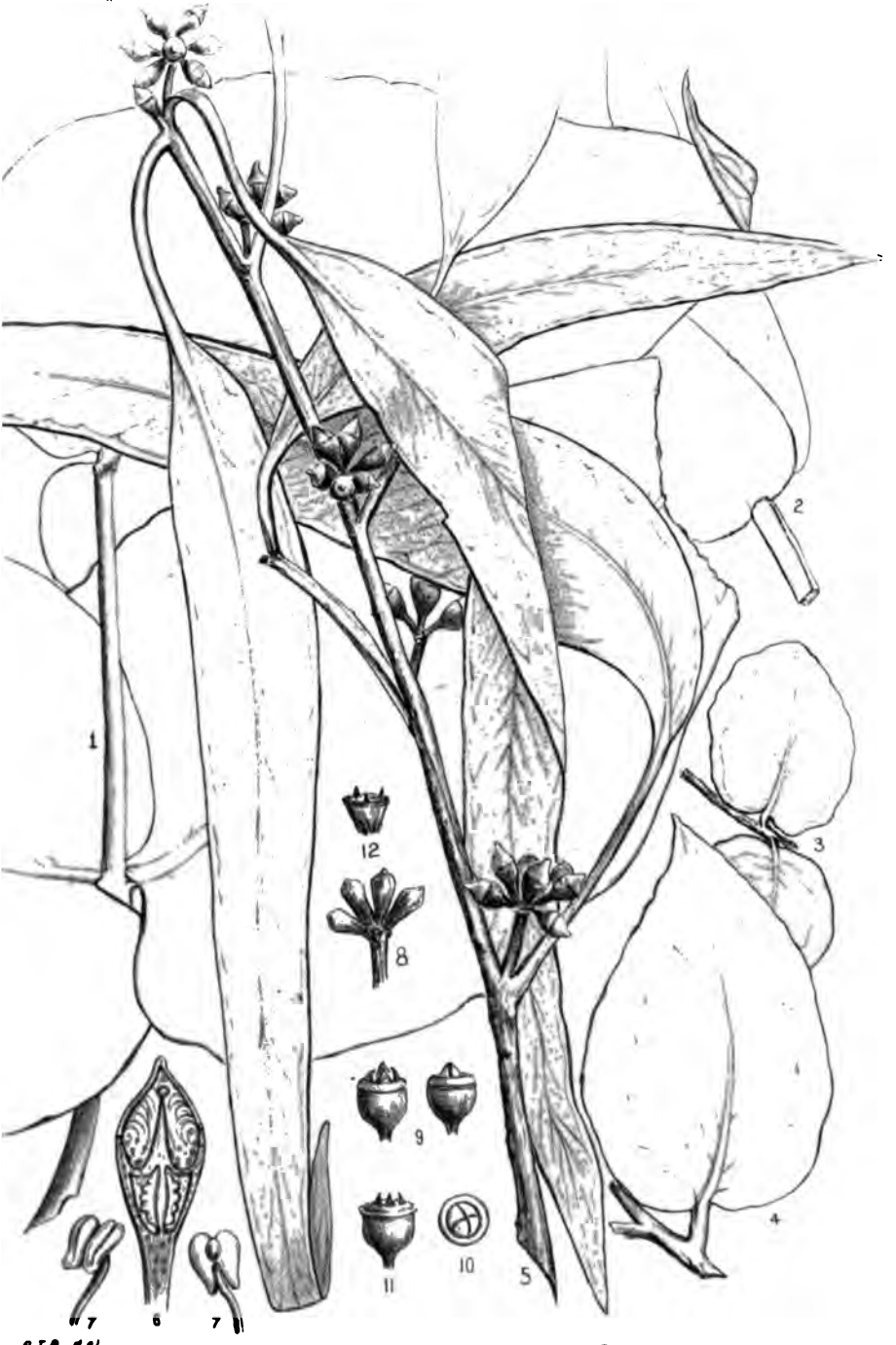

EUCALYPTUS BRIDGESIANA, *R.T.B.*

RTB del.

EUCALYPTUS PALUDOSA, *R T B*

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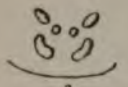

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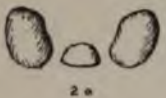

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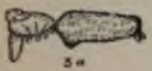

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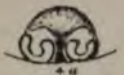

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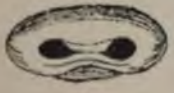

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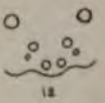

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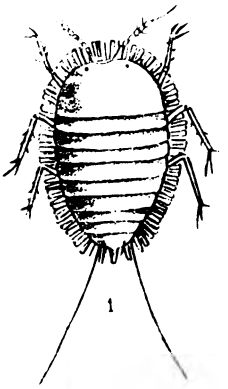


W. W. F. del.

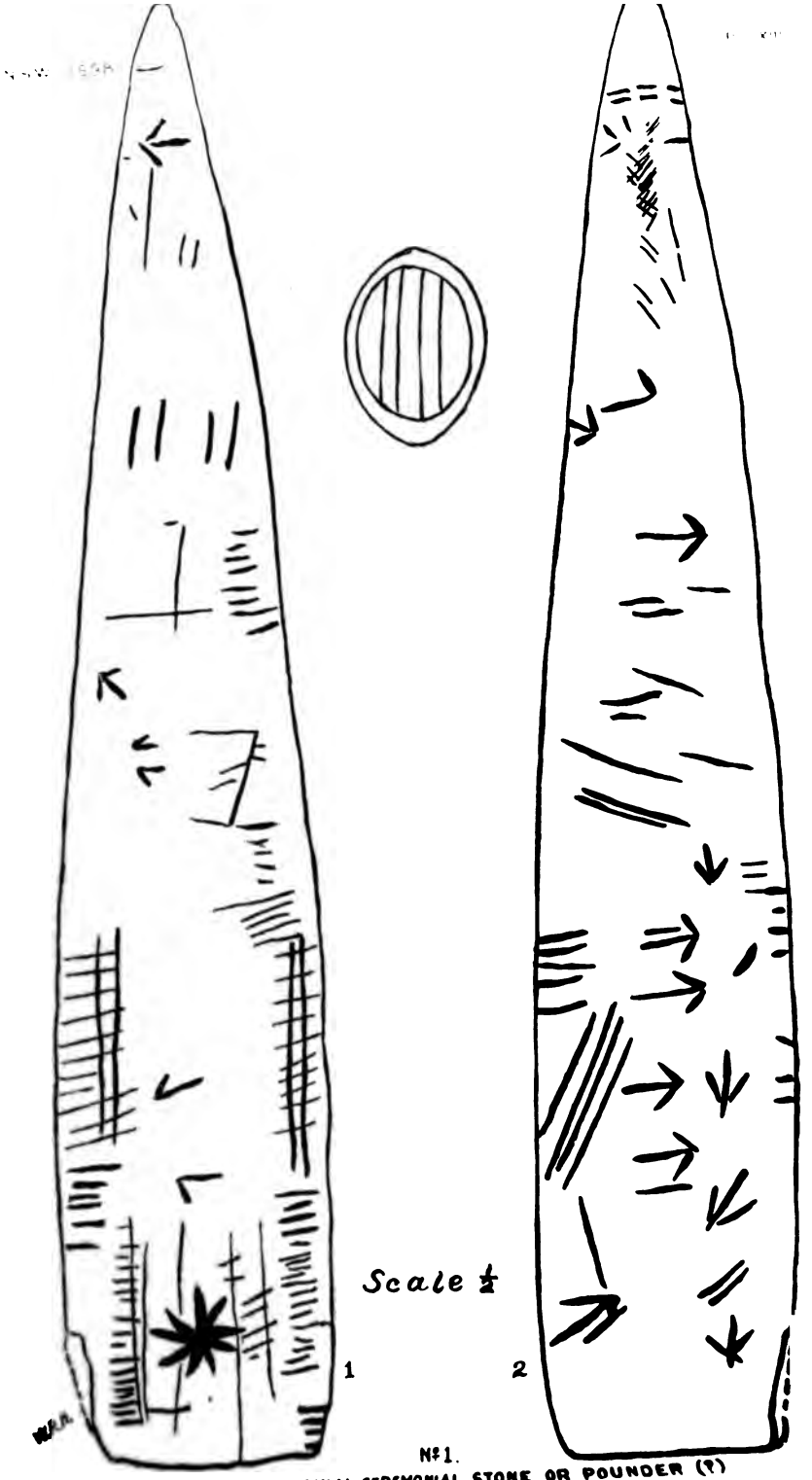
W.W.F. del.

EUCALYPTUS LÆVOPINEA, R T B
Silver Top Stringybark

EUCALYPTUS DEXTROPINEA, *R.T.B.*

No 1.

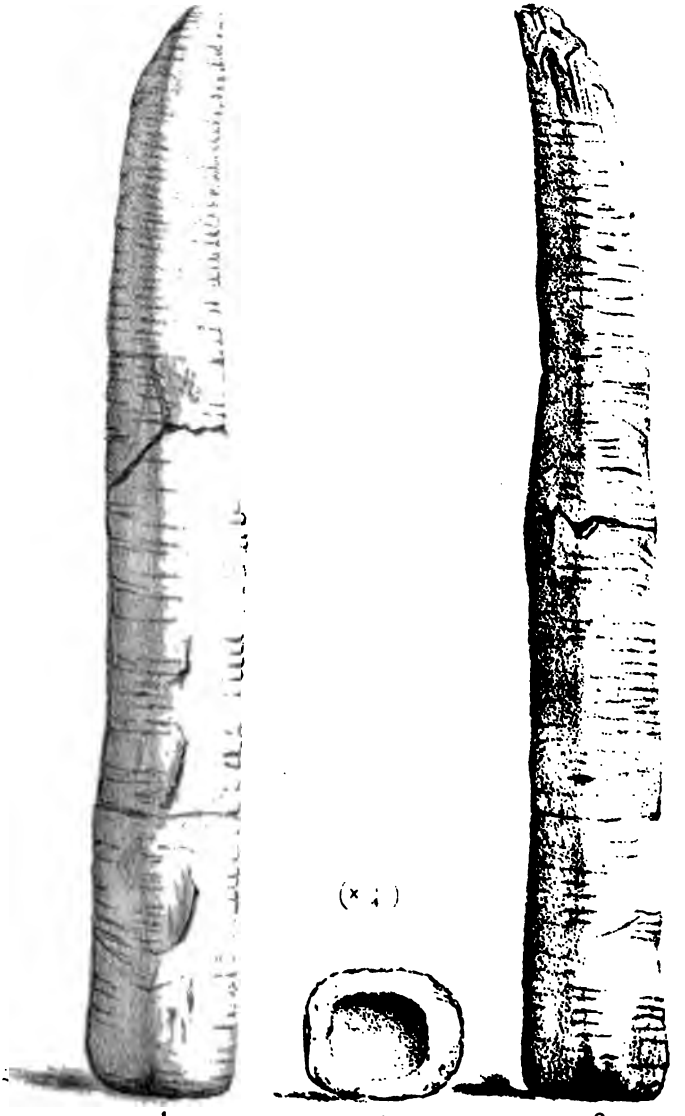
ABORIGINAL CEREMONIAL STONE OR POUNDER (?).



№1.
ABORIGINAL CEREMONIAL STONE OR POUNDER (?)

Fig. 1 (No. 2). Fig. 2 (No. 3).

ABORIGINAL CEREMONIAL STONES OR POUNDERS (?).



N° 2.

ABORIGINAL CEREMONIAL STONE OR POUNDER (?).

B. del.

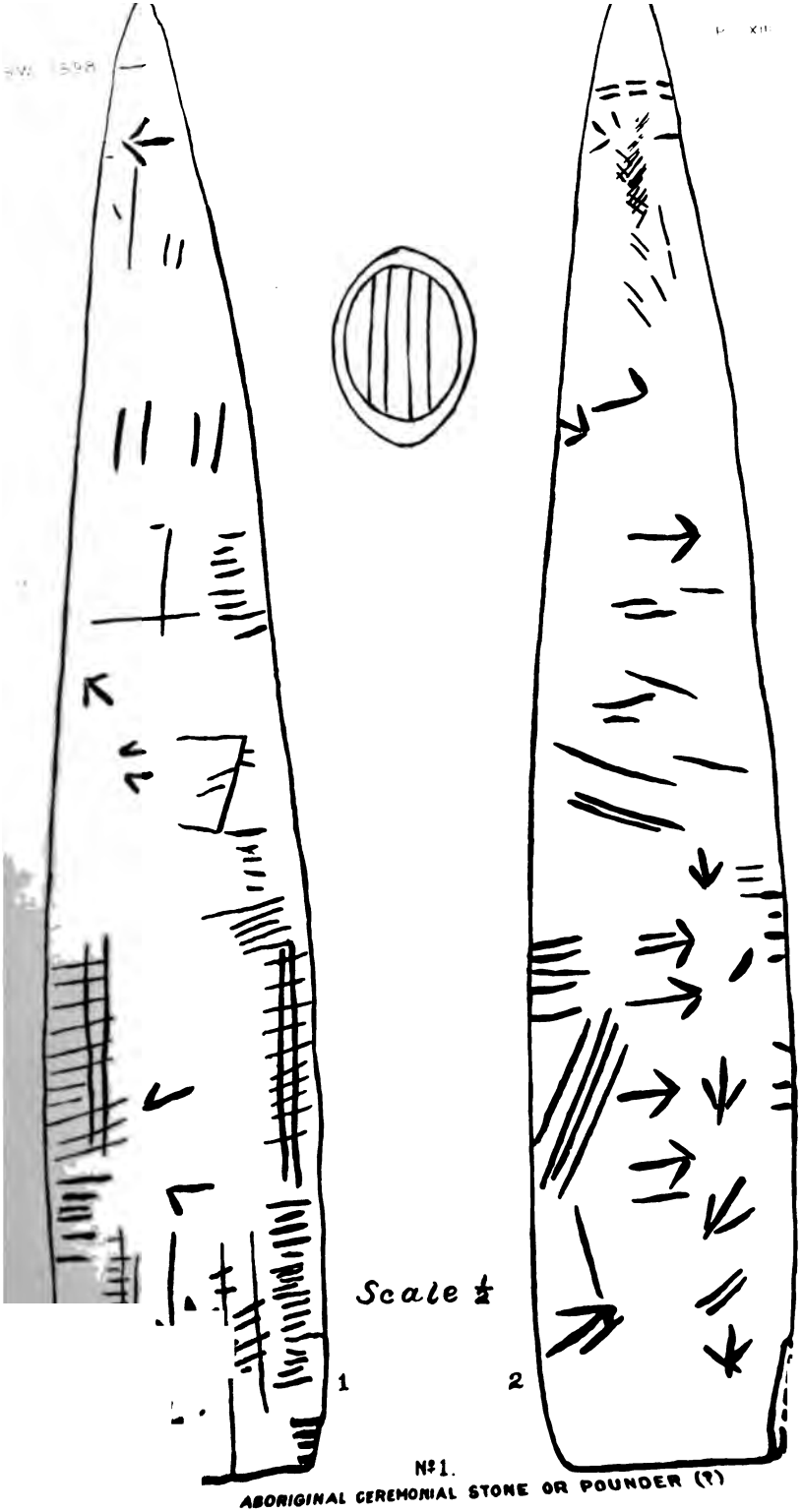
R.T.B. del.

EUCALYPTUS DEXTROPINEA, R.T.B.

No 1.

ABORIGINAL CEREMONIAL STONE OR POUNDER (?).

A. A. Lawson.



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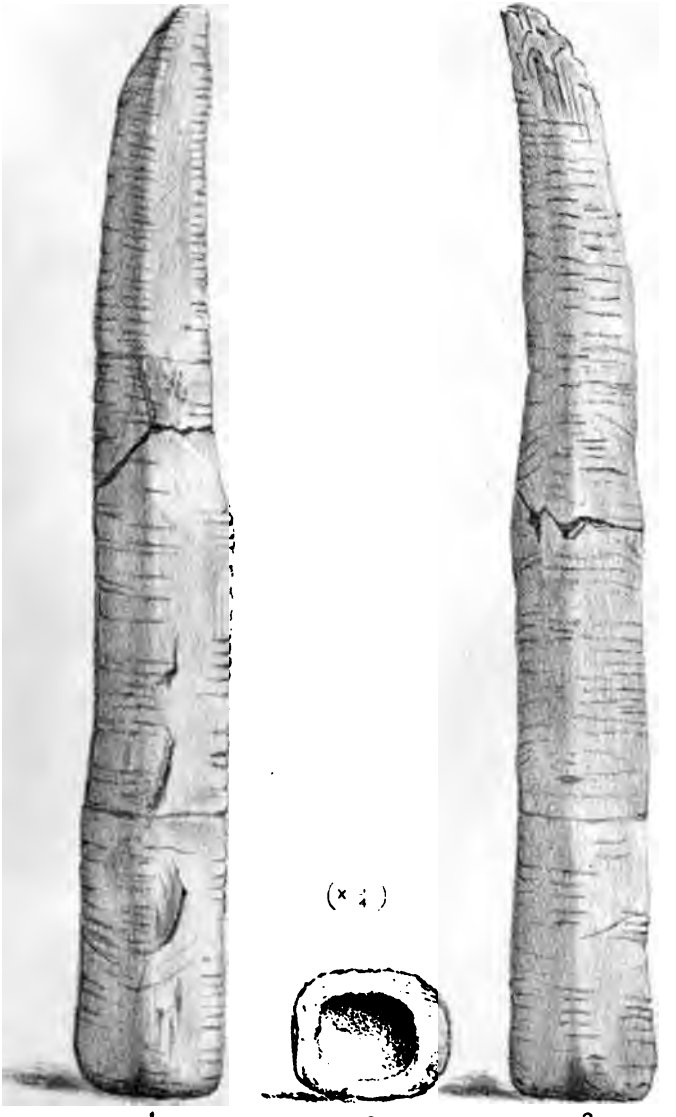
ABORIGINAL CEREMONIAL STONE OR POUNDER (?)

Fig. 1 (No. 2). Fig. 2 (No. 3).

ABORIGINAL CEREMONIAL STONES OR POUNDERS (?).



N° 2.

ABORIGINAL CEREMONIAL STONE OR POUNDER (?).

R T B. del.

Fig. 1 (No. 4). Fig. 2 (No. 5).

ABORIGINAL CEREMONIAL STONES OR POUNDERS (?).

A. A. Lawson.

Fig. 1 (No. 6). Fig. 2 (No. 8).

ABORIGINAL CEREMONIAL STONES OR POUNDERS (?).

A. A. Lawson.

Fig. 1 (No. 7). Fig. 2 (No. 9).

ABORIGINAL CEREMONIAL STONES OR POUNDERS (?).

A. A. Lawson.

P.J. Eckert, del.

EUCALYPTUS FRAXINOIDES. N. Sp.

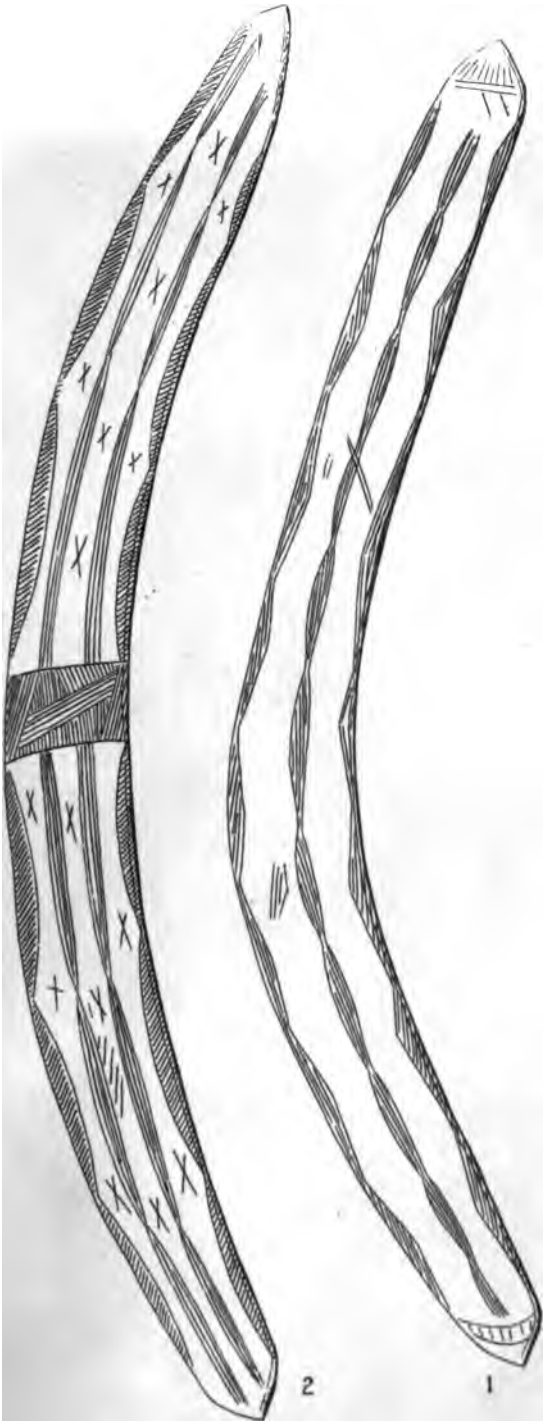

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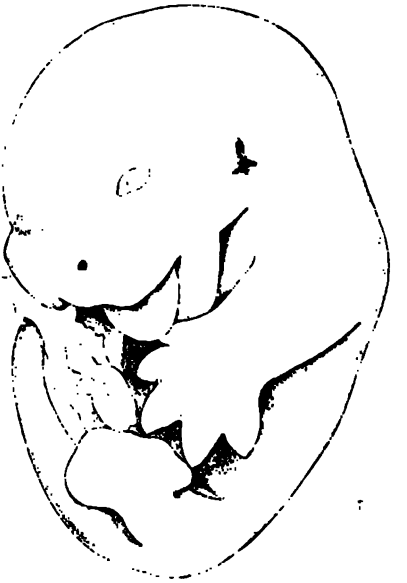
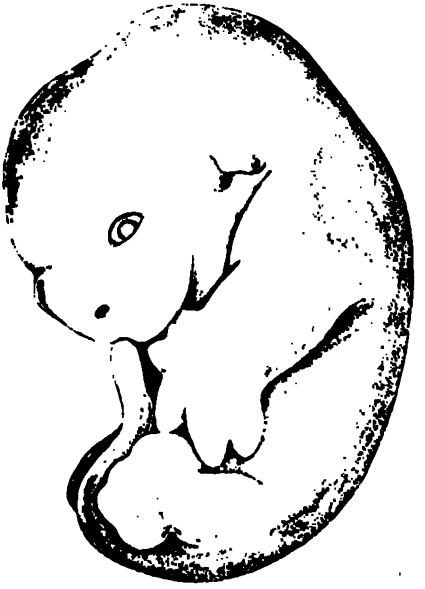
Fig. 1 (No. 4). Fig. 2 (No. 5).

ABORIGINAL CEREMONIAL STONES OR POUNDERS (?).





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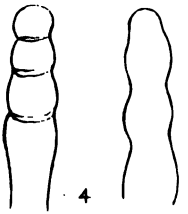

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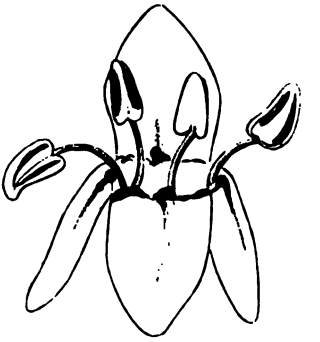

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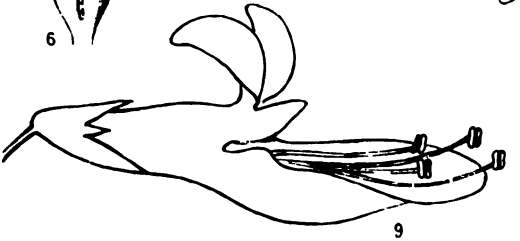

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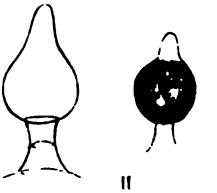

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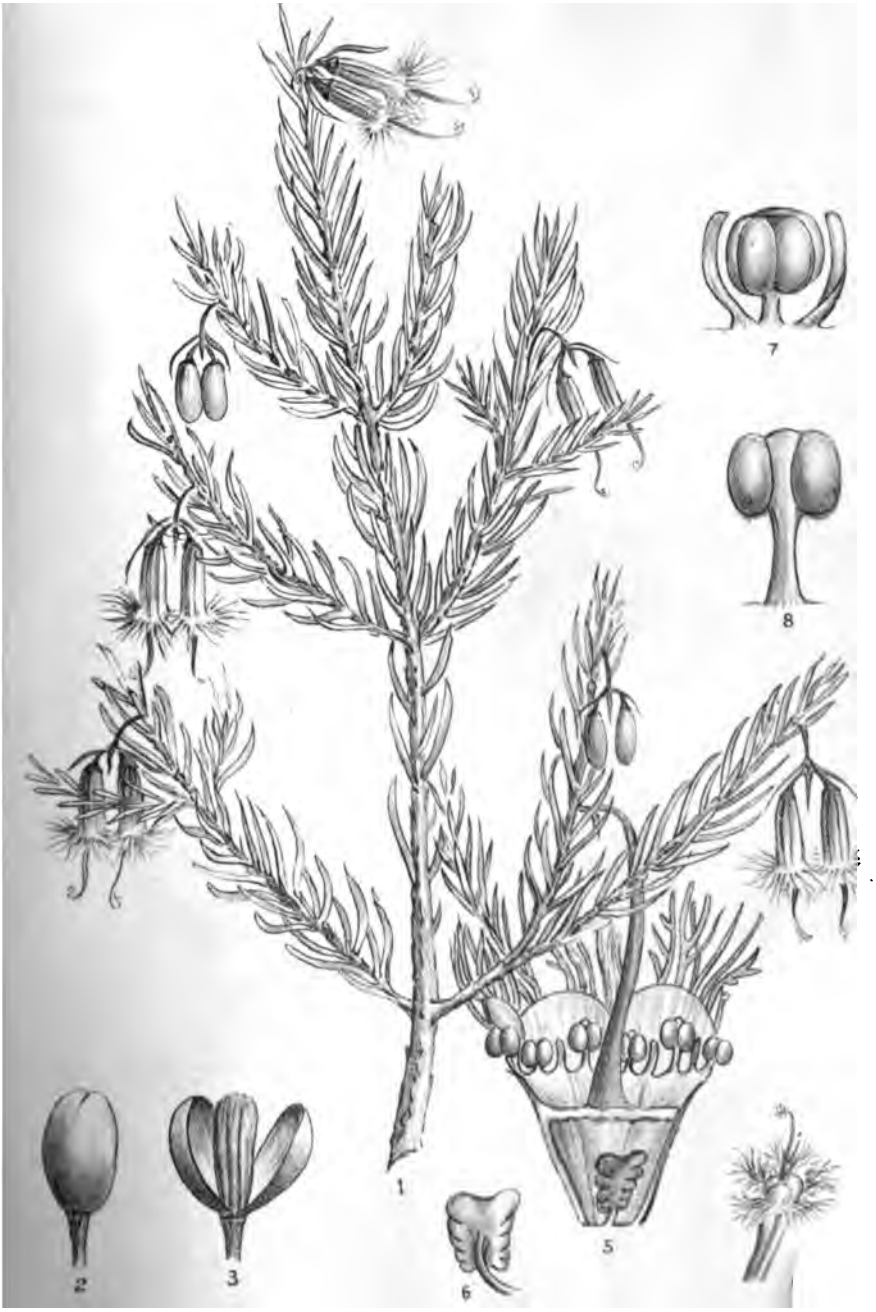
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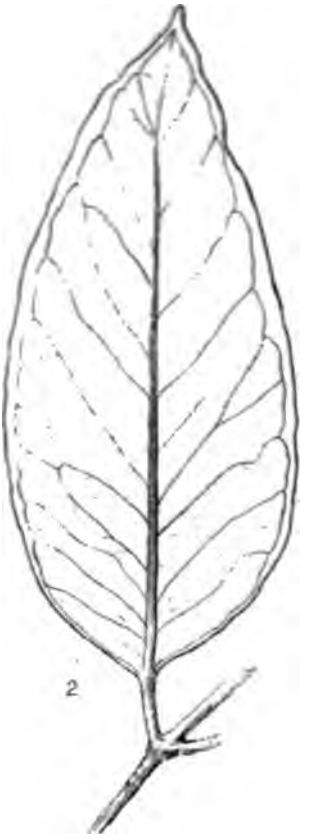

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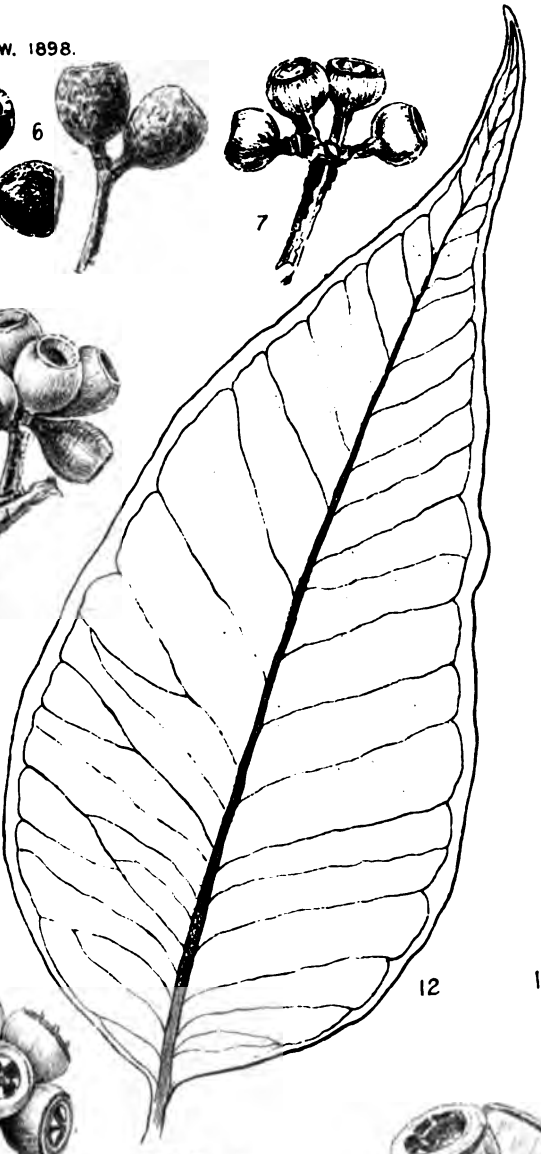

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